AMERICAN JOURNAL OF

# PUBLIC HEALTH

and THE NATION'S HEALTH

The 77th Annual Meeting, New York, N. Y.
October 24 – 28

Volume 39 JUNE, 1949 Number 6

*Published Monthly at 374 Broadway, Albany 7, N. Y., by the*

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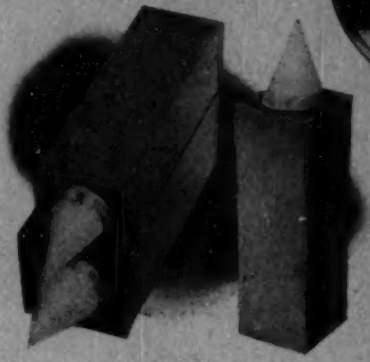

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*Cecil, R. A.: A Textbook of Medicine. Philadelphia, W. B. Saunders Co., 1947, p. 876.

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# American Journal of Public Health
## *and* THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 39 — June, 1949 — Number 6


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Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Reader's Guide in your Library.



Published by the American Public Health Association at 374 Broadway, Albany 7, N. Y.
Executive Office, 1790 Broadway at 58th St., New York 19, N. Y.

NOTICE:—Subscription $7.00 per year for United States, Cuba and Mexico, South and Central America; $7.50 for Canada; and $8.00 for other countries. Single copies 70 cents postpaid.

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Address correspondence regarding editorial contents and manuscripts to C.-E. A. Winslow, Dr.P.H., Editor, 1790 Broadway, New York 19, N. Y.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany 7, N. Y., or 1790 Broadway at 58th St., New York 19, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932, under the Act of March 3, 1879.

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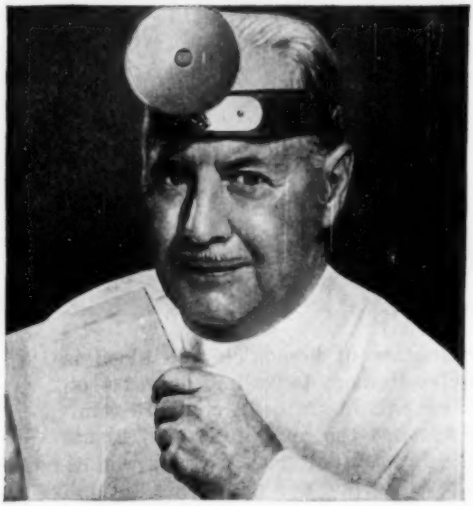

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*than any other cigarette*

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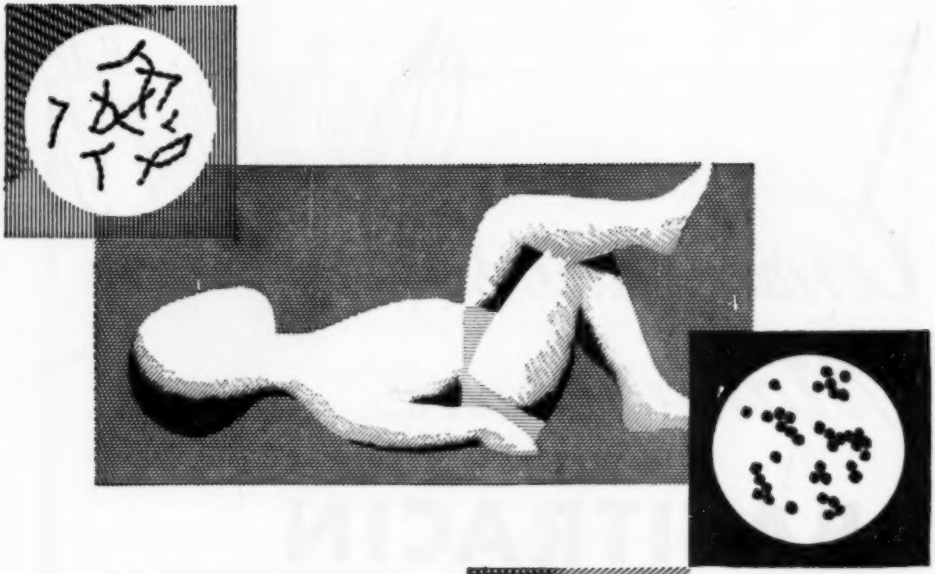

## *Three immunities with three 0.5 cc. injections*

Protection against three organisms—C. Diphtheriae, Cl. Tetani, and H. Pertussis—is conveniently provided by *Diphtheria and Tetanus Toxoids Alum Precipitated and Pertussis Vaccine Combined Squibb* given in three doses of 0.5 cc. each at monthly intervals.

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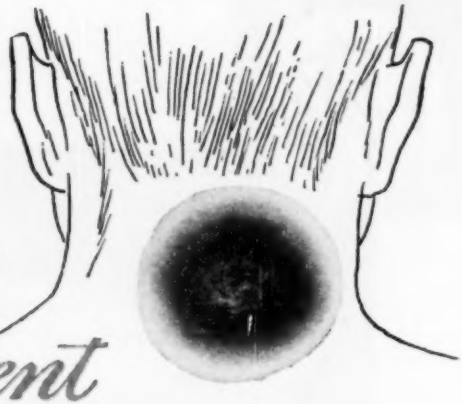

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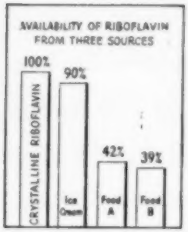
## Here is evidence that the riboflavin in ice cream is almost completely available for use by the body.

It was discovered recently that by actual analysis the riboflavin content of ice cream is much higher than previously believed. This is important news but it is only the first chapter of the story.

Other recent research proves that riboflavin occurs in ice cream in a form that the body can use efficiently. A study conducted by Everson and co-workers* in which college women served as experimental subjects, shows that the riboflavin of ice cream is almost 100% available to the human body.

> When a supplement of riboflavin was furnished by ice cream, it was nearly as well absorbed as the vitamin in its pure crystalline form and better than that in two other test foods studied. These facts are illustrated in the chart below.

The presence of nutritive constituents in foods is not alone sufficient to insure proper nourishment. Nutrients also must be in a form which can be assimilated readily and put to use by the body. It is increasingly apparent that *availability* of nutrients is just as important as is actual nutrient *content* in selecting foods for specific dietary recommendations. It is reassuring to know that, as to riboflavin, ice cream ranks high on both counts. This is important for everyone concerned with planning nutritious diets, whether to please normal appetites, or the often difficult appetites of the ill and the aged.




*Everson, G., Wheeler, E., Walker, H., and Caulfield, W. J. *Availability of riboflavin of ice cream, peas and almonds judged by urinary excretion of the vitamin by women subjects.* J. Nutr. *35*:209 (Feb.) 1948.

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National DAIRY COUNCIL

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# Don't be your age

## To all who want to look and feel younger than they are, nutrition research offers sound advice

EVERYONE knows that science has increased the number of years we can expect to live. We are learning, also, to make the extra years count. Good nutrition is one important factor in extending the period of adult vitality.

Recent research makes it apparent that, while aging persons may need less calories because of decreasing energy requirements, it is highly desirable for their health and happiness to keep the nutrients in their diets at a high level.

**Learn from nutrition research**—Ohlson and associates* have studied groups of older women. Important observations were made as to their dietary habits, their physical status, and their need for protein, calcium, and phosphorus. These older women were found to need protein for maintenance of body tissues just as much as younger women. If they omitted milk from their diets, their intakes of protein and of other nutrients suffered.

Approximately one gram of calcium daily was found to be necessary, on the average, to keep these older women in calcium equilibrium. However, since calcium is not abundantly distributed among foods, the women received this amount of calcium only if their diets contained liberal amounts of milk and milk products. The calcium content of the women's diets was directly related to the amount of milk they consumed.

Many adults, especially women, show a considerable degree of demineralization of the skeletal structure by the age of fifty. This condition may lead to broken bones and the familiar stoop shoulders of old age. The precise mechanism requires further study.

**Make your extra years count**—In the study, the groups of women considered to have good health tended to drink more milk, eat more vegetables, whole-grain cereals, and eggs than women in corresponding poor health groups. The study suggests that ill health may be associated with food intakes that are unsatisfactory in quality and quantity. But the authors point out that while ill health itself may result in reduction of food intake, the symptoms of ill health also may be exaggerated by inadequate food.

As the American life span increases, the need to guard the health of older citizens grows more and more vital. Good nutrition constitutes one important factor of protection. Liberal consumption of milk and its products is one basic step toward good nutrition.

*Ohlson, M. A., Roberts, P. H., Joseph, S. A., and Nelson, P. M. *Dietary practices of 100 women from 40 to 75 years of age.* J. Am. Diet. Assn. *24*:286 (April) 1948.

Roberts, P. H., Kerr, C. H., and Ohlson, M. A. *Nutritional status of older women.* J. Am. Diet. Assn. *24*:292 (April) 1948.

Ohlson, M. A., Brewer, W. D., Cederquist, D. C., Jackson, L., Brown, E. G., and Roberts, P. H. *Studies of the protein requirements of women.* J. Am. Diet. Assn. *24*:744 (Sept.) 1948.

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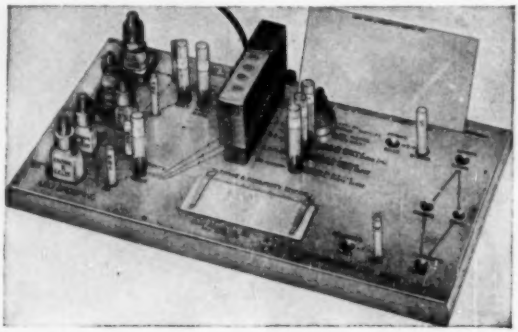

# Prevent dangerous errors in blood typing

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*1. "A Note on Blood Grouping and Cross Matching with Special Reference to a Convenient Grouping Cross Matching Board." I. W. Brown, Jr., M.D. In press.*

*2. "The Demonstration of Anti-Rh Agglutinins —An Accurate and Rapid Slide Test." L. K. Diamond, M.D. and N. M. Abelson, M.D. Jl. Lab. & Clin. Med., Mar. 1945.*

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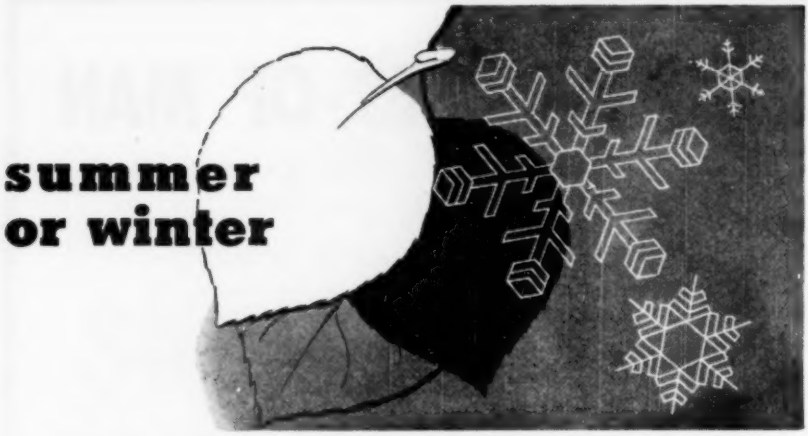


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American Journal of Public Health
*and* THE NATION'S HEALTH

Volume 39 June, 1949 Number 6

# Diagnostic Problems in Medical Mycology*

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THE laboratory diagnosis of mycoses is a problem of interest to clinicians as well as to laboratory workers. There are certain inadequacies and pitfalls inherent in current laboratory methods of detecting fungus infections which sometimes delay a differential diagnosis and which seriously limit our knowledge of the epidemiology of the mycoses.

The diagnosis of systemic fungus infections has aroused increasing interest during recent years, yet, although some improvements have been made, I know of no radically new dependable diagnostic methods in medical mycology. The diagnosis of a mycosis still rests upon one or, preferably, both of two procedures, the actual demonstration of the fungus in tissue or exudate and its isolation in pure culture with a specific identification of the fungus. The clinical variability of mycoses is notorious, so that even in superficial skin lesions of the hands and feet a laboratory diagnosis is desirable in the differentiation of dermatophytosis and dermatitis. In the case of pulmonary mycoses the roentgenologist finds it difficult to make more than a provisional diagnosis, for, although some fungi seem to show a predilection for certain lung areas, the diversity of lesions produced by even a single fungus makes the x-ray diagnosis at best probable rather than definitive. Serologic methods of diagnosis, in spite of improvements in techniques, remain only adjuncts to the direct demonstration of pathogenic fungi. The laboratory diagnostician, therefore, still needs to recognize and know individual fungi.

Methods of searching for, isolating, and recognizing fungi are described in so many texts that it would be repetitious to discuss here, one by one, the various mycoses and the laboratory procedures involved in the diagnosis of each. It may be worth while, however, to discuss some particular problems commonly met.

It would appear from an appraisal of the fungi which reach my laboratory for identification that lack of familiarity with the common saprophytic fungi is a frequent source of confusion. A bacteriologist who would discard at once a single colony of *Staphylococcus* ap-

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 10, 1948.

pearing in a culture from a skin ulcer or from sputum may send for identification a *Penicillium* or an *Alternaria* which has appeared under such circumstances. The spores of fungi are freely air-borne, and viable spores of harmless fungi may fall into the culture or may be found in considerable numbers on skin surfaces or even within body cavities. The protective mechanisms of the body are not able to destroy promptly spores of some of these harmless saprophytic fungi. This can be demonstrated readily by injecting spores into a laboratory animal and recovering them in culture, sometimes weeks later, even though there has been no growth or multiplication in the experimental animal. Therefore, growth of saprophytic fungi in cultures made from exposed lesions is to be expected.

Viable spores of fungi are also inhaled in great numbers and may grow in cultures made from subsequently cultured sputum. The isolation of saprophytic fungi from sputum is therefore a common experience and these fungi may be of no more significance than the multitude of saprophytic bacteria also present. If one is searching for a fungus in pulmonary disease it is as important to differentiate probable pathogens and probable saprophytic contaminants among the fungi as among the bacteria. However, there are some saprophytic fungi which are occasionally pathogenic.

The importance of an accurate specific identification of fungi can be illustrated by a discussion of a fungus which is a member of a large genus most species of which are of no medical importance. This fungus, *Aspergillus fumigatus*, is a common saprophyte, yet it can, on occasion, cause pulmonary disease. Most of the green and gray-green fungi isolated from sputum will be other species of *Aspergillus* or *Penicillium* and only a careful examination of the fungus will enable one to recognize this particular species. This fungus is commonly present in superficial soil layers and in decaying vegetation. In a search for mycoses in rodents I have very often isolated it from the lungs of these animals although no gross or microscopic lesions could be found. Presumably the colonies appearing in these cultures come from recently inhaled spores. In cultures of human sputum the fungus sometimes appears, but I should attach no importance to a single or to occasional colonies appearing in a series of cultures unless there is supporting evidence of an etiologic relationship. Such evidence might consist of its appearance in large numbers in cultures made from several sputa collected with due precautions against contamination. If the patient has been working or living in a dusty environment, this may explain the appearance in culture of an occasional colony of this fungus. More convincing evidence of an etiologic relationship is furnished by the direct microscopic demonstration of typical hyphal fragments in the patient's sputum. The contorted, frequently septate, and often somewhat encrusted structure of these fragments, indicates that they actually grew in the lung and were not merely air-borne fragments recently inhaled.

The yeast-like fungus, *Candida albicans*, poses a different problem. It is not commonly air-borne but, on the contrary, may be considered as almost a normal inhabitant of the body cavities. *C. albicans* is commonly present as a secondary invader in sputum in almost every type of pulmonary disease, and it can be temporarily eliminated by iodides or gentian violet without affecting the course of the disease. It is capable of causing thrush and may modify pulmonary disease of other etiology, or in rare cases, be of primary importance. Usually, however, its isolation in sputum cultures is of no significance. Its abundance in a sputum specimen is significant, only if precautions are taken to avoid contamination

from the mouth and if the specimen is examined at once. *C. albicans, Fusarium, Cephalosporium,* and some other fungi multiply rapidly in sputum held at room temperature after collection. A 24 hour specimen or a specimen mailed to a laboratory is unsatisfactory, if not worthless, for mycological study. Even after isolation of *C. albicans* from a fresh sputum specimen and its specific determination by appropriate methods the question of its etiologic importance remains. Certainly, in most cases, another primary etiology can eventually be found.

I have mentioned two saprophytic fungi which under certain circumstances can become pathogenic, and some criteria more or less useful in judging their importance. There are other fungi which are without pathogenic properties but which present important diagnostic problems because of their resemblance to pathogens. Some of the Basidiomycetes or mushroom fungi which frequently appear as contaminants in sputum cultures are confusing because in colony appearance and in microscopic morphology they resemble the important pathogen, *Coccidioides immitis*. An examination of these fungi serves to illustrate the dependence mycologists place upon morphology in the identification of fungi. Many Basidiomycetes produce spores which are called oidia and are formed by the fragmentation of hyphae of haploid mycelia. There is nothing distinctive about them except that in some species they are borne on somewhat specialized terminally branching hyphae. They bear a superficial resemblance to the chlamydospores of *Coccidioides immitis* which, however, differ from them in certain important respects. The spores of *Coccidioides* are borne on special hyphae or conidiophores in which the fertile portion is nearly twice the diameter of the vegetative hypha from which it originates, the spore chains are constricted at the septa which separate spores, and there is a condensation of protoplasm within the hyphal segment which results in a chain of spores separated by empty spaces. This morphological differentiation is especially important because of the resemblance between the two fungi in culture.

One further problem associated with the recognition of pathogens involves poorly known fungi which cause the rare mycoses. A good example would be one of the rare types of mycetoma, in some of which the isolation of the fungus in culture is difficult or has been accomplished only a few times. In such cases there may be doubt about the identity of the fungus involved as well as about its etiological relationship. Here, one needs adequate amounts of material, from pus or biopsies, in order to determine as a preliminary step whether the fungus is actually growing in the lesions. Some ten years ago I received for identification an unfamiliar fungus which I identified as a *Fusidium*. It had been isolated from a lesion clinically typical of actinomycosis, but it was isolated only once and was not demonstrated in the tissues. I did not see another strain of this fungus until recently, when the same species was isolated from enlarged axillary nodes and submitted for identification. In the second case careful examination of stained sections failed to demonstrate the fungus but an acid-fast bacillus was isolated in culture and demonstrated in sections of nodes. It was concluded that the fungus was a culture contaminant in both these cases, but it is not a familiar contaminant and if it had been isolated repeatedly and found upon direct examination in pus or tissues further study might have justified another conclusion.

One of the practical problems confronting the laboratory diagnostician in the examination of pathologic material is the recognition of artefacts resembling fungus structures. In the case of dermatophytosis one of the most troublesome

is the so-called "mosaic fungus" which is actually an accumulation of cholesterol in the interstices of epidermal cells. There may be a superficial resemblance to fungus hyphae and, in fact fungi may be found associated with the mosaic. However the mosaic, as the name indicates, forms a network pattern extending around epidermal cells, the individual parts vary abruptly in diameter, and flat crystals with reëntrant angles can frequently be observed.

The so-called "myelin globules" present in large amounts in certain types of pus and sputum often assume forms suggesting budding fungi and hyphal fragments. It is usually possible to recognize these readily by observing the bizarre forms present, the laminated structure, and the increase in size or numbers of these bodies after the material is mixed with a sodium hydroxide solution. Other structures appearing in sodium hydroxide preparations of pus or sputum are clusters of fatty acid crystals and bacterial colonies which may be mistaken for the granules characteristic of actinomycosis.

There have been hopeful attempts to achieve shortcuts such as the use of culture media which will support growth of pathogens and inhibit saprophytes, but there is no satisfactory substitute for an acquaintance with the fungi and the circumstances under which they appear in cultures made from pathologic tissues or exudates. It is useful to know and recognize the characteristics of saprophytic fungi. It is essential to know and recognize the characteristics of the pathogens.

In the preparation of differential culture media for the isolation of pathogenic fungi there have been some useful advances. The first practical use of an antibiotic was in the preparation of selective culture media. Since pathogenic fungi, with the exception of *Actinomyces bovis*, are resistant to penicillin and streptomycin, the addition of 20 units per milliliter of each of these to a culture medium inhibits the bacteria which may be present in pus or sputum but permits the growth of fungi. The use of this medium, and of media containing other bactericidal ingredients, permits the ready isolation of fungi from ulcers and sputum in cases where more rapidly growing saprophytic bacteria would otherwise inhibit growth of pathogenic fungi. Robbins,[9] Georg,[4] Mackinnon,[6] Benham,[1] and others have obtained information about vitamin and growth factor requirements of some of the dermatophytes which have led to the improvement of culture media and new criteria for the limitation of species. Salvin[10] has determined the amino acid and vitamin requirements of *Histoplasma* and other pathogens and the influence of these nutritional factors upon the growth types of diphasic fungi.

The need for specialized knowledge and experience in the laboratory diagnosis of mycoses by recognition of the fungi has led to continued attempts to substitute for the actual demonstration and identification of fungi less direct diagnostic procedures. One of the most convenient of such procedures is the intradermal test which is based upon the well known principal that, as in many bacterial diseases, a cutaneous sensitization follows many fungus infections. If this sensitization were specific and if a specific antigen could be prepared from the fungus causing it, a cutaneous reaction to the intradermal injection of the antigen would have considerable diagnostic significance. The usefulness of such a specific test would be limited only by the fact that acquired cutaneous sensitization may persist for many years; consequently, a reaction may refer to an earlier infection rather than to the present condition which is under consideration.

The pioneer studies of cutaneous sensitization induced by the dermatophytes made by Bloch, Jadasshon, and their

students date from 1925 and many investigators have produced an enormous literature on the subject which I shall not attempt to review. Trichophytin, so far as I am aware, has little use as a diagnostic agent at the present time although there is still interest in it from the experimental viewpoint in some laboratories. Coccidioidin has had a very useful application to epidemiologic studies of coccidioidomycosis. Most of the coccidioidin used has been prepared by Dr. C. E. Smith [12] who has carefully tested the material, utilizing only those lots which give a minimum of nonspecific reactions. Recently acquired coccidioidin sensitivity is generally accepted as diagnostic of coccidioidomycosis even though the patient may have remained asymptomatic and the fungus cannot be demonstrated in exudates. Antigens for use in skin testing have been prepared from many other pathogenic fungi. Most of these have had a very limited use and adequate studies of specificity have not been carried out. One fungus antigen, histoplasmin, first prepared by Van Pernis, Benson, and Holinger in 1941,[13] has been widely used in epidemiologic studies. Histoplasmin is not specific, since laboratory animals can be sensitized to it by experimental infection with other fungi.[3] Howell [5] believes that by use of a critical dilution of histoplasmin a diagnostic interpretation can be made. The subject is of considerable medical interest because of Christie and Peterson's [2] and of Palmer's [8] demonstration of a correlation between histoplasmin sensitivity and the occurrence of non-tuberculosis pulmonary calcification and because of the high incidence (80–90 per cent) of histoplasmin sensitivity in some geographic areas. The interpretation of the histoplasmin skin reaction is equivocal, and in my opinion the diagnosis of histoplasmosis based on a cutaneous reaction to histoplasmin is not justified at the present time.

Agglutinins, precipitins, and complement-fixing antibodies have been sought in human mycoses and in experimentally infected animals by many investigators during the past 40 years. The accumulated evidence seems to indicate that these serologic methods have a very limited usefulness in the practical diagnosis of mycoses. Martin [7] and his associates failed to find complement-fixing antibodies in a considerable number of patients with proved blastomycosis and particularly in those with localized cutaneous lesions. They did not attempt to increase the sensitivity of the antigen because of the inherent uncertainties of the method and the relative ease of making a definite diagnosis by mycologic examinations. They considered that the test had some prognostic value since they observed, as has Smith in coccidioidomycosis, that a rise in titer indicates generalization of the infection. In the case of the most pressing diagnostic problem in mycology, that of the possible occurrence of a prevalent mild form of histoplasmosis, serologic methods have not as yet been helpful. Salvin and Hottle's [11] report of the rise and subsequent fall of titer and eventual disappearance of complement-fixing antibodies in experimentally infected rabbits and our failure in field studies to find them in sera from individuals with strong skin reactions indicate that in histoplasmosis, as in other mycoses these methods may not be of value in the diagnosis of mild or healed cases.

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# WHO on Maternal and Child Health

The report of the first session of WHO's expert Committee on Maternal and Child Health held in Geneva, January 24–29, is now available. Martha M. Eliot, M.D., its United States member, was unanimously elected Chairman and Dr. Marion Yang, the Chinese member, Vice-chairman. Other members represent Belgium, Czechoslovakia, India, Mexico, Turkey, and the United Kingdom.

Among the actions taken was the increase in the committee's membership to 12. Recommendations called for the establishment of an information bureau in the Maternal and Child Health Section to meet the widespread demand from many countries on various aspects of maternal and child health; that a health education service be developed in WHO; that coöperation between the Section and FAO and UNICF continue to provide supplies for child health programs, particularly clean and safe milk supply everywhere, and for nutrition work, particularly in rural areas; that mental health be included in the maternal and child health program; that the staff of the Section be increased to give countries assistance with demonstration teams, visiting consultants, research development of rural programs and those for handicapped children; that governments be urged to introduce compulsory immunization for children against such diseases as smallpox and diphtheria; that all possible action be taken to relieve the world-wide shortage of nurses; and that maternal and child health services be organized in underdeveloped areas.

The meeting discussed means by which pediatricians who would not otherwise be able to do so might be supplied with funds to attend the International Congress of Pediatrics, to be held in Zurich, July 24–29, 1950. In connection with the Congress a child health exhibition will be held from July 20 to August 5. The expert Committee recommended that WHO participate in planning an exhibition to demonstrate a maternal and child health program with particular reference to the function of the public health nurse and the midwife.

# Histoplasmin Sensitivity Among Cattle*

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SINCE Ruhe and Cazier [1] have recently reviewed the occurrence of histoplasmosis in animals, no attempt will be made to review the literature. The disease has been reported in rats, mice, dogs, ferrets, and possibly a horse. The importance of these casual observations of infected animals in the epidemiological picture is difficult to evaluate because of the lack of a sufficient size sample of animals or of adequate diagnostic technic.

There have been, however, several serious attempts to find an animal reservoir of this disease. Emmons and his group [2, 3] have concentrated on attempts to isolate the organism from the tissues of wild or domestic animals. They reported the isolation of the organism from one house mouse (out of almost 1,000 studied), from 16 rats (*Rattus norvegicus*) (an average of 2.8 per cent), but negative results from numerous other animals such as woodchucks, rabbits, various species of mice, etc.

Our studies have been concentrated in the main on another approach to the problem, namely, the distribution of skin sensitivity to histoplasmin, an extract of the fungus *Histoplasma capsulatum*. The present paper reports studies in histoplasmin sensitivity among cattle and a comparison of this sensitivity among cattle and children in the same county in Kansas. We were first led to study cattle by the chance finding that of 13 head living on the farm of one of our suspected human histoplasmosis cases, two reacted to histoplasmin. Large scale studies were then done, at first with the active coöperation of Dr. Philip Cazier of the Bureau of Animal Industry, Department of Agriculture, whose assistance is gratefully acknowledged.

The tests were performed in most cases at the same time as tuberculin tests. No cross-reactions with tuberculin were found. One-tenth ml. of histoplasmin was injected intracutaneously in the caudal fold. Tests were read at 72 hours. A positive reaction was evidenced by an edematous swelling at the site of inoculation which was easily palpated and usually clearly visible.

The histoplasmin (Lots H-15 and H-40) was furnished by Dr. Arden Howell, Public Health Service. For the early tests, the same lot of histoplasmin (H-15), which had been extensively employed in tests on human beings, was used. The dilution of antigen to be used in cattle was arrived at empirically on the first farm tested. A dilution of 1 to 100 was first used and no reactions were noted in the 13 cows tested. When the herd was retested with a dilution of 1 to 10, 2 cows showed strong reactions, while none of the others showed any reaction. Lot H-15 was accordingly employed in a

* Presented before the Epidemiology Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 11, 1948.

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dilution of 1 to 10 in tests on 589 head of cattle in eastern Kansas. Because of a shortage of Lot H-15, it was necessary to employ Lot H-40 for the remainder of the study. Since H-40 was known to be slightly weaker than H-15, it was employed in a dilution of 1 to 5. Twelve hundred and eighty-five cattle throughout the state, including all those tested in Shawnee County, received this test dose.

A total of 1,874 cattle were tested in Kansas. Approximately 22 per cent of these were beef cattle and 78 per cent were dairy cattle. In the eastern third of the state 1,319 head were tested with 4.2 per cent showing positive reactions, in the central third, 136 were tested with 1.5 per cent positive, and in the western third, 419 were tested without finding a single positive. Study of these results indicates that histoplasmin sensitivity in cattle falls off as one moves westward in Kansas. A similar falling off in histoplasmin sensitivity in human beings in Kansas was shown earlier by Bunnell and Furcolow.[4]

A more detailed analysis of the comparison of histoplasmin sensitivity among human beings and cattle was attempted in Shawnee County, Kansas, a county in the eastern third of the state in which the state capital, Topeka, is located. Over 1,100 children had been tested in Topeka and their rate of reaction to histoplasmin was known.[4] For comparison with the cattle, only records of those children less than 13 years of age were used.

In Shawnee County 432 cattle were

FIGURE 1

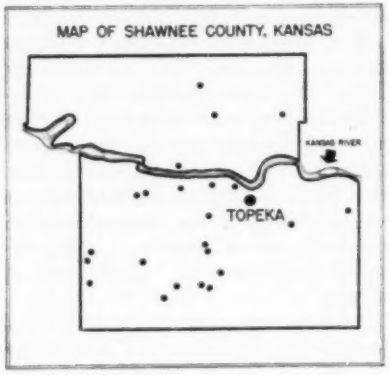


FIGURE 2

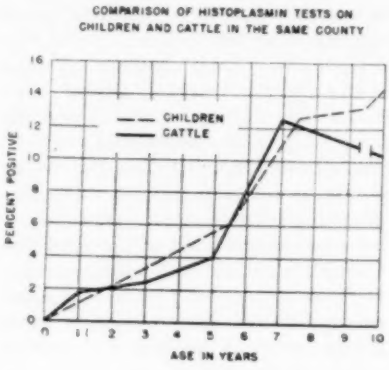


TABLE 1

*Comparison of Histoplasmin Tests on Children and Cattle in the Same County*

| | *Children (1:1,000 histoplasmin Lot H-15)* | | | | |
|---|---|---|---|---|---|
| | *Age* | | | | |
| | *5–6* | *7–8* | *9–10* | *11–12* | *Total* |
| Number Tested | 98 | 103 | 38 | 184 | 423 |
| Number Positive | 6 | 13 | 5 | 32 | 56 |
| Per cent positive | 6.1 | 12.6 | 13.2 | 17.4 | 13.2 |

| | *Cattle (1:5 histoplasmin Lot H-40)* | | | | | |
|---|---|---|---|---|---|---|
| | *Age* | | | | | |
| | *Under 2* | *2–3* | *4–5* | *6–7* | *8 and Over 8* | *Total* |
| Number Tested | 54 | 167 | 100 | 72 | 39 | 432 |
| Number Positive | 1 | 4 | 4 | 9 | 4 | 22 |
| Per cent Positive | 1.8 | 2.4 | 4.0 | 12.5 | 10.3 | 5.1 |

TABLE 2

*Histoplasmin Sensitivity by Age of Cattle in Shawnee County, Kansas*

| | Age | | | | | |
|---|---|---|---|---|---|---|
| | *Under 2* | *2 and 3* | *4 and 5* | *6 and 7* | *8 and Over* | *Total* |
| | | | *Original Tests* | | | |
| Number Tested | 16 | 109 | 81 | 53 | 23 | 282 |
| Number Positive | 0 | 4 | 4 | 8 | 4 | 20 |
| Per cent Positive | 0 | 3.7 | 4.9 | 15.1 | 17.4 | 7.1 |
| | | | *Institutional Herds* | | | |
| Number Tested | 38 | 58 | 19 | 19 | 16 | 150 |
| Number Positive | 1 | 0 | 0 | 1 | 0 | 2 |
| Per cent Positive | 2.6 | 0 | 0 | 5.3 | 0 | 1.3 |
| | | | *Total Cattle Tested* | | | |
| Number Tested | 54 | 167 | 100 | 72 | 39 | 432 |
| Number Positive | 1 | 4 | 4 | 9 | 4 | 22 |
| Per cent Positive | 1.8 | 2.4 | 4.0 | 12.5 | 10.3 | 5.1 |

tested. These cattle were distributed among 23 farms as illustrated in Figure 1. They ranged in age from less than 1 year to 16 years. Relatively few cattle over 9 years of age were tested. Table 1 shows the comparison of the histoplasmin skin test results on these 432 cattle compared to 423 children who were 12 years of age or less. In Figure 2 the comparison is shown graphically. From this figure it is evident that there are marked similarities in reaction rates between cattle and children of similar age.

A peculiarity was noted in the cattle testing, the significance of which is not clear. In the original studies, approximately 282 cattle on 21 farms scattered throughout the county were tested. Because of the interesting results obtained, an additional 150 head of cattle were tested from two institutional herds located on the outskirts of Topeka. The results of tests on these two institutional herds are tabulated separately in Table 2 as they are quite different from those obtained with the scattered farm testing, since only 2 of these 150 cattle, or 1.3 per cent, were positive to histoplasmin. Of the scattered 282 cattle tested on 21 premises, 7.1 per cent were positive to histoplasmin. The peculiar epidemiological characteristics of the two institutional farms compared with the remainder of the county are under investigation at present. So far no lead has been uncovered to explain the differences in histoplasmin reactors.

In summary, it is evident that histoplasmin reactors occur in cattle and that their geographic distribution in Kansas resembles that of histoplasmin reactors in human beings. Determination of the age-specific rates for cattle and men in a single county in Kansas makes it evident that the rates are quite similar in human beings and cattle of like age. From this it is deduced that both cattle and men are probably infected from the same outside source and that cattle do not constitute an animal reservoir of importance in the spread of the disease to human beings.

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# Histoplasmin Sensitivity and Coccidioidal Infection*

## 1. Occurrence of Cross-Reactions

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AFTER we began preparing coccidioidin from asparagine synthetic medium [1] and distributing it on request, reports received indicated that the material was specific and that the coccidioidal endemic area of the United States was confined to the arid Southwest. The first seriously discordant note was the experience of Furcolow and Nelson in an orphanage in Ohio [2] wherein a considerable number of reactors were discovered. They found few reactors with dilute coccidioidin but a large number with concentrated material. Their findings made us suspect some unrecognized form of cross-reaction, for in our experience in coccidioidin surveys [1] most reactors are detected with the more dilute (1:1,000) material and only 10 per cent more are detected with a 1:100 dilution. However, until 1941 when we began our systematic coccidioidin surveys in the San Joaquin Valley Army Air Fields,[3, 4] we had observed no difficulties in interpreting the tests. Then we soon realized that either our coccidioidin did evoke cross-reactions or the endemic area extended into the central United States.

A number of equivocal and occasionally definitely positive coccidioidin

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* Presented before the Epidemiology Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 11, 1948.

These investigations are an activity of the Commission on Acute Respiratory Diseases, Army Epidemiological Board, Office of the Surgeon General, Department of the Army. The study of coccidioidomycosis has been carried out at the Department of Public Health and Preventive Medicine, Stanford University School of Medicine, San Francisco, Calif.

reactions were discovered among groups of soldiers who had never before been west of the Rockies. In most instances the skin tests were performed too soon to have permitted locally acquired coccidioidal infection. With the enthusiastic coöperation characteristic of the commissioned and non-commissioned officers at those air fields, the new personnel would even be marched past us for their initial skin tests as they detrained, yet unexplainably equivocal and positive reactions would be elicited. The discovery by Emmons of *Haplosporangium parvum* in Arizona and the cross-reaction of haplosporangin and coccidioidin [5] added to our suspicion that an infection by another fungus might be responsible for these unexplainable reactions to coccidioidin. Indeed, in 1943 we prepared haplosporangin and discovered that these soldiers with equivocal coccidioidin tests frequently reacted vigorously to haplosporangin. However, many others did not react and it was evident that other agents must have been responsible for the nonspecific coccidioidin reactions.

In casting about for another possibility we were reminded that in 1940 when we were first experimenting with serological tests for coccidioidal infection, we prepared an antigen from *Histoplasma capsulatum* which fixed complement in a patient with coccidioidal granuloma to the same high titer as did antigen made from *Coccidioides*. This same histoplasmin was used for skin testing by Aronson in his very significant Arizona survey of non-tuberculous pulmonary calcifications and was reported by him as evoking reactions.[6] The home states of the equivocal reactors to coccidioidin coincided with those central states having high frequency of pulmonary calcifications in non-reactors to tuberculin. The fact that we [7] had noted calcifications in coccidioidal lesions, evidence greatly extended by Aronson's association of Arizonon pulmonary calcifications with coccidioidin sensitivity, caused us to suspect the rôle of some other fungus in the central states. Meleney's review [8] brought to notice the fact that histoplasmosis was most frequently reported from the same area.

The parallel between histoplasmosis and coccidioidomycosis was already strong. Rixford and Gilchrist [9] believed *Coccidioides immitis* was an animal parasite, as Darling [10] deemed *Histoplasma capsulatum*. Then as Ophüls and Moffitt [11] demonstrated that the former is a fungus, da Rocha-Lima [12] suspected and De Monbreun [13] proved that *Histoplasma* is also a fungus. All that would be needed to complete the analogy would be to demonstrate a benign form of histoplasmosis, as Gifford [14] and Dickson [15] showed with coccidioidal erythema nodosum. Accordingly in 1943, we [16] called attention to the problem of interpreting coccidioidin reactions in individuals from the Ohio River basin and contiguous areas, and the possible association of these bizarre reactions with histoplasmosis and pulmonary calcifications. These suggestions were only conjectures and certainly do not detract from the brilliant discoveries of those who have been associating pulmonary calcifications with sensitivity to histoplasmin. Our subsequent investigations with histoplasmin have not dealt with pulmonary calcifications but with the relationship to coccidioidin sensitivity.

Christie's investigations at Vanderbilt University, Nashville, Tenn., of pulmonary calcifications in those not reacting to tuberculin, convinced him that neither coccidioidal nor haplosporangial infections were responsible. He turned to *Histoplasma* and in 1944 sent us histoplasmin prepared on beef-broth medium by himself and Peterson. We shall refer to it as Vanderbilt histoplasmin, which is the same material used by Christie and Peterson in their studies of pulmonary calcifications.[17–20] Using

Vanderbilt histoplasmin in 1:100 dilution, we tested a number of our "equivocal" coccidioidin reactors and invariably they were strongly positive. We kept the histoplasmin on hand for tests when an interpretation of coccidioidin reactions was difficult, but not until the next year did we use it systematically.

As the Christie-Peterson discoveries progressed, we realized that we should include a histoplasmin test with our routine coccidioidin test, and in the spring of 1945 we began this simultaneous testing. With the publication of Palmer's [21, 22] momentous papers associating pulmonary calcifications with sensitivity to histoplasmin in nurses, we sought a supply of the same histoplasmin, which he secured from Emmons of the National Institute of Health. It should be emphasized that neither Emmons nor his associate Salvin at the N.I.H. distribute histoplasmin, nor do Christie and Peterson any longer. Emmons very kindly made an exception for us and sent us some of his Lot 3 histoplasmin, which was grown on asparagine synthetic media comparable to that used for tuberculin and coccidioidin.[23] This histoplasmin will be referred to hereafter as N.I.H. histoplasmin. Although Emmons suggested the same 1:1,000 dilution which Palmer had used, we first tried the N.I.H. histoplasmin in the 1:100 dilution we were using for the Vanderbilt histoplasmin and our coccidioidin. However, it frequently evoked stronger reactions in those known to be undergoing coccidioidal infections than we elicited from our coccidioidin. When we used the N.I.H. material in 1:1,000 dilution, it compared very closely with Vanderbilt 1:100 histoplasmin as we shall show later in more detail.

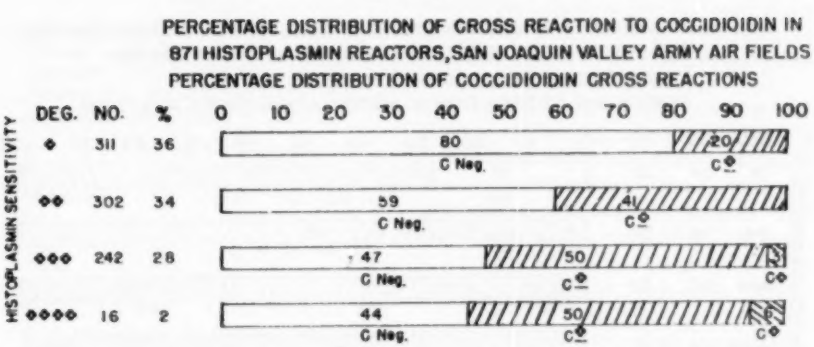
The coccidioidin was a 1:100 dilution of Lot 9, the same lot used throughout our Army studies. The coccidioidin and histoplasmin were injected at the same visit in the usual 0.1 ml. dosage intradermally in the volar surface of the left forearm, the histoplasmin proximally and the coccidioidin distally. The description of our testing and retesting procedures is presented in detail elsewhere.[3] Except at retests when all nonreactors to coccidioidin were being rechecked, one person did all of the testing and reading. At the time of retests, another of the investigators would also test or interpret, but the permanent tester was working alongside. Thus uniformity in techniques and interpretations was assured. Readings were made at 24 or 48 hours and were the generally accepted ones. Redness without induration of 5 mm. or more, or induration less than 5 mm. in diameter were considered equivocal and recorded as plus-minus (±). Induration of 5 to 9 mm. was recorded as one-plus (+). Induration of 10 to 14 mm. was recorded as two-plus (++) and of 15 mm. and more as three-plus (+++). When necrosis occurred, the reaction was recorded as four-plus (++++).

### CROSS-REACTIONS OF COCCIDIOIDIN IN DOMINANT REACTORS TO HISTOPLASMIN

Out of 3,376 simultaneous histoplasmin tests in coccidioidin non-reactors or equivocal reactors, 864 (25.6 per cent) of the histoplasmin tests were positive. There were 7 others with one-plus coccidioidin reactions whose large histoplasmin tests placed them in the group dominantly sensitive to histoplasmin. It was in this group of 871 histoplasmin reactors that the vexatious equivocal and unexplainable positive coccidioidin tests were seen.

Figure 1 indicates the association between the degree of dominant histoplasmin sensitivity and these cross-reactions of coccidioidin. As we shall see later, there was no significant difference between histoplasmin tests using N.I.H. 1:1,000 histoplasmin or Vanderbilt 1:100 histoplasmin, so Figure

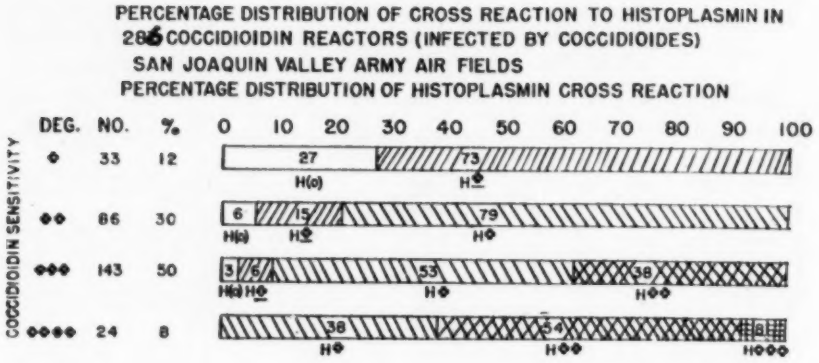
FIGURE 1




1 combines the two. We note that with one-plus histoplasmin reactions, 20 per cent of the coccidioidin reactions were equivocal. With two-plus histoplasmin reactions the proportion of equivocal coccidioidin reactions doubled. The three- and four-plus histoplasmin reaction were accompanied by a still higher proportion of coccidioidin cross-reactions, with 7 actually positive (one-plus) coccidioidin reactions. These positive coccidioidin reactions were in recent arrivals to the coccidioidal endemic area who had normal sedimentation rates and negative coccidioidal serological tests, evidence against any current coccidioidal infection. The greater the sensitivity to histoplasmin, the larger was the proportion of nonspecific cross-reactions to coccidioidin. However, even with three- and four-plus histoplasmin reactions, approximately half the simultaneous coccidioidin tests were entirely negative. Thus, coccidioidin did not cross-react to a degree which interfered with interpretation. This is in accordance with the experience of Christie and Peterson,[17] Palmer,[21] Emmons, Olson, and Eldridge,[23] and Howell's animal studies.[24] However, when the coccidioidin concentration was increased to 1:10, nearly all "equivocal" reactions became definitely positive. For example, a trial of 1:10 coccidioidin in 12 histoplasmin reactors equivocal (±) to 1:100 coccidioidin resulted in 10 unquestionably positive reactions. When Furcolow and Nelson[2] in their Ohio orphanage increased the coccidioidin concentration, the proportion of reactions rose from 1 per cent with 1:1,000 coccidioidin to 50 per cent with 1:10. As we have recently pointed out,[25] in some patients with coccidioidal pulmonary cavitation it is necessary to go up to 1:10 coccidioidin to evoke a reaction. Patients with disseminated coccidioidal infections (coccidioidal granuloma) frequently have very poor sensitivity to coccidioidin, which is of some prognostic value.[1]

Such testing with coccidioidin may bring one to concentrations in which cross-reactions to dominant histoplasmin sensitivity pose a vexatious problem. However, we who are concerned with coccidioidal infections are relatively fortunate in that coccidioidin appears to be much more "specific" than histoplasmin. As Groover, *et al.*[26] observed in their patients with pulmonary disease, "Patients with a strong reaction to histoplasmin in a 1 to 1,000 dilution usually showed a mild reaction to coccidioidin in 1 to 10 dilution; those with a strong reaction to coccidioidin in the 1 to 1,000 usually had a mild reaction to the 1 to 1,000 dilution of histoplasmin." Thus, only if the coccidioidin was used in a concentration 10 times that advised for

FIGURE 2




routine tests, did cross-reactions in dominant histoplasmin reactors result. On the other hand, histoplasmin in its accepted concentration produced cross-reactions in those dominantly sensitive to coccidioidin. It is this cross-reaction which we shall consider next.

### CROSS-REACTIONS OF HISTOPLASMIN IN DOMINANT REACTORS TO COCCIDIOIDIN

The investigation of cross-reactions of histoplasmin in dominant reactors to coccidioidin dealt with smaller numbers because once detected, coccidioidin reactors were not retested routinely. In Figure 2 are presented the histoplasmin reactions of 286 dominant coccidioidin reactors who received simultaneous histoplasmin and coccidioidin tests in the Army Air Force studies. One hundred and forty-six were tested in routine surveys and 140 were undergoing actual coccidioidal infections at the time of the tests. There was no significant difference in the relative reactions within the two groups, so that they are combined for presentation. One notes that, as coccidioidin sensitivity increased, the cross-reactions with histoplasmin became greater in degree as well as in proportion. While 27 per cent of the 33 one-plus coccidioidin reactors did not react at all to histoplasmin, each of the 24 four-plus cocidioidin reactors also reacted to histoplasmin, over half with a two-plus response. Over nine-tenths of the histoplasmin tests in coccidioidin reactors were positive, with nearly two-fifths showing at least two-plus reactions.

Of course, one asks if these reactions to histoplasmin might not have been the results of independently acquired sensitivity to histoplasmin. In most instances this possibility could not be excluded. However, we had a group of 31 who failed to react both to histoplasmin and to coccidioidin and subsequently acquired coccidioidal infections. Twenty-four were Army personnel and 7 were Stanford Medical School personnel who underwent laboratory infections. Eighteen of the former and 5 of the latter had definite symptoms, while 6 of the Army and 2 of the laboratory infections were inapparent. In 19 of the Army and all 5 of the laboratory infections which were clinically manifest, we obtained serological evidence of infection, as well as "conversion" of the coccidioidin test. As we see in Table 1, the smallest coccidioidin reactions were over 10 mm. in diameter and in the 9 recorded as two-plus, each had developed one-plus sensitivity when tested with histoplasmin. Of the 15 three-plus coccidioidin reactors, 9 (60 per cent) gave

TABLE 1

*Dominant Coccidioidin Reactions and Histoplasmin Cross-Reactions in 31 Persons Originally Negative to Coccidioidin and Histoplasmin Who Subsequently Acquired Coccidioidal Infections*

| Degree of Sensitivity to Histoplasmin | Degree of Sensitivity to Coccidioidin | | | |
|---|---|---|---|---|
| | C++ | C+++ | C++++ | Total |
| H+ | 9 | 9 | 2 | 20 |
| H++ | 0 | 6 | 5 | 11 |
| Total | 9 | 15 | 7 | 31 |

one-plus reactions to histoplasmin and 6 were two-plus. There were 7 four-plus reactors to coccidioidin, 2 giving one-plus reactions to histoplasmin and 5 having two-plus reactions. Thus we observe this same pattern, the patients with greatest sensitivity to coccidioidin having developed greatest sensitivity to histoplasmin. The preceding negative histoplasmin test eliminated the possibility of a dual infection having been responsible for the cross-reaction.

These cross-reactions of histoplasmin in coccidioidal infection substantiate the belief that histoplasmin sensitivity is acquired by actual infection. Also, they could support the possibility that fungi other than *Histoplasma* might be responsible for the histoplasmin sensitivity. However, such fungi still would have to fulfil the requirement of marked restriction in geographic distribution.

## BLASTOMYCIN REACTIONS IN COCCIDIOIDAL INFECTIONS

Emmons's[23] clinical studies at St. Elizabeths Hospital indicated cross-reactions between histoplasmin and blastomycin. Moreover, experimental infections of laboratory animals with *Histoplasma capsulatum* and *Blastomyces dermatitidis*[23, 24] have demonstrated a large proportion of cross-reactions. Howell's[24] studies indicated that by serial dilutions, the homologous skin testing material became differential. Bunnell and Furcolow,[27] by using Howell's method of serial dilutions, concluded that, in their patient infected by *Histoplasma capsulatum* who also reacted to blastomycin, the histoplasmin sensitivity was dominant.

We made no attempt to compare sensitivity of blastomycin and histoplasmin in dominant histoplasmin reactors. However, we did make a small study of blastomycin reactions in patients who were undergoing coccidioidal infections.

Donald Martin of Duke University kindly supplied us with skin testing "vaccine" of yeast phase *Blastomyces*. In 18 patients undergoing clinical coccidioidal infections, we performed simultaneous tests with 1:100 coccidioidin, 1:1,000 histoplasmin and this blastomycin. As Table 2 shows, the nonspecific

TABLE 2

*Histoplasmin and Blastomycin Cross-Reactions in 18 Patients Undergoing Clinical Coccidioidal Infections Arranged According to Coccidioidin Sensitivity*

| Degree of Histoplasmin and Blastomycin Sensitivity | | Degree of Coccidioidin Sensitivity | | | |
|---|---|---|---|---|---|
| | | C+ | C++ | C+++ | Total |
| H± | B± | 3 | 1 | 0 | 4 |
| H± | B+ | 0 | 1 | 1 | 2 |
| H+ | B± | 0 | 1 | 0 | 1 |
| H+ | B+ | 0 | 4 | 5 | 9 |
| H+ | B++ | 0 | 0 | 1 | 1 |
| H++ | B++ | 0 | 0 | 1 | 1 |
| Total | | 3 | 7 | 8 | 18 |

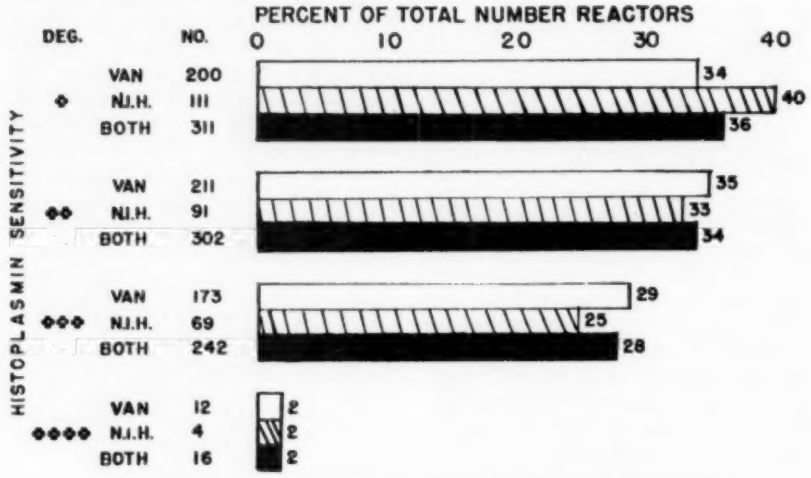
cross-reactions by the two latter antigens were almost identical. Thus, in this small group there was indication that the cross-reaction of histoplasmin elicited by coccidioida. infection is shared by yeast phase blastomycin.

## SIZE OF HISTOPLASMIN REACTIONS—COMPARISON OF VANDERBILT AND N.I.H. HISTOPLASMIN

Figure 3 presents the distribution of size of reactions in dominant reactors to histoplasmin. We note that slightly more than one-third were one-plus, one-third were two-plus, between one-quarter and one-third were three-plus, and only 1 in 50 was four-plus. The concordance between Vanderbilt 1:100 histoplasmin

FIGURE 3

DISTRIBUTION OF SIZE OF REACTIONS ACCORDING TO SOURCE OF THE HISTOPLASMIN IN 871 ARMY AIR FORCE PERSONNEL DOMINANTLY SENSITIVE TO HISTOPLASMIN.




VAN.= 1-100 HISTOPLASMIN FROM CHRISTIE & PETERSON VANDERBILT UNIV. SCHOOL OF MEDICINE (295)

N.I.H.= 1-1000 HISTOPLASMIN FROM EMMONS, NATIONAL INSTITUTE OF HEALTH, U.S.P.H.S. (275)

and the N.I.H. 1:1,000 histoplasmin was very close.

Further comparisons of the N.I.H. and Vanderbilt histoplasmins gave additional evidence of their comparability in the dilutions used. For instance, the overall percentage of histoplasmin reactors in 1,950 persons negative or equivocal to coccidioidin tested with the Vanderbilt material was 26.1. Of the 1,426 tested with N.I.H. histoplasmin, 24.8 per cent reacted. At Minter Field 230 coccidioidin-negative or equivocally reacting personnel tested between July and November, 1945, with Vanderbilt histoplasmin were retested with N.I.H. material in January, 1946. One hundred and sixty-two were negative both times and 3 were equivocal both times. Of the 65 positives, 3 giving one-plus reactions to N.I.H. histoplasmin had been negative (1) or equivocal (2) to Vanderbilt material, but these were balanced by 2 who had one-plus reactions to Vanderbilt histoplasmin and who were negative (1) or equivocal (1) to N.I.H. histoplasmin. Thirty-two histoplasmin-positive reactions were recorded as the same in both tests. In 27 they differed by a single "plus" (15 being stronger with the N.I.H. material and 12 with the Vanderbilt). In only 1 instance did they differ by two "plus" (one-plus Vanderbilt and three-plus N.I.H.). Allowing for unavoidable variations in techniques of injections, these results appear quite uniform. Moreover, in the 2 to 6 months elapsing between tests, there was no evidence of loss of sensitivity.

The question also arises as to comparative specificity of the histoplasmins. There was no evidence that the Vander-

bilt material on beef broth gave gross nonspecific reactions as compared with the N.I.H. material in synthetic medium. The question really centers on the matter of cross-reactions in the dominant coccidioidin reactors. In 52 patients undergoing active coccidioidal infections, simultaneous tests were performed with 1:100 coccidioidin, 1:100 Vanderbilt and 1:1,000 N.I.H. histoplasmin. The two histoplasmins gave the same reactions in 34 cases. In 6 instances, one was equivocal and the other one-plus (Vanderbilt histoplasmin giving the larger reaction once and N.I.H. 5 times). In 12 patients the difference was by one "plus," with N.I.H. giving stronger reactions 8 times and Vanderbilt 4 times. In no test was there a difference of more than a single "plus." Thus, the cross-reactions did not differ significantly between the two materials.

As these comparisons were made prior to the production of histoplasmin either by Howell for the Division of Tuberculosis Control of the U. S. Public Health Service or by the Eli Lilly Company, we cannot compare the two materials now being distributed most widely. However, it is apparent that one should know his material and use it in accordance with its accompanying directions.

### DURATION OF HISTOPLASMIN SENSITIVITY

Allusion has already been made to the the retest of 65 reactors to histoplasmin after an interval of 2 to 6 months and the fact that sensitivity had persisted. Olsen, Bell, and Emmons [28] mention a 7 per cent reversion from positive to negative out of 57 reactors retested after an interval of 3 to 8 months. The time intervals and numbers in both groups are very small. We were able to observe maintenance of histoplasmin sensitivity long after half a dozen reactors had taken up residence in California, an area relatively free of the agent or agents producing dominant histoplasmin sensitivity. One Army reactor after 9 years in Ohio had lived 10 years in California. Another, after 14 years in Oklahoma, had been 10 years in California. A third, after 17 years in Indiana, had resided 12 years in California. A fourth, after 18 years in Ohio, had lived 27 years in California. In tests of persons at Stanford Medical School, we discovered 2 other reactors who had been in California continuously for 21 and 24 years after coming from the Middle West (Kansas and Missouri and Illinois). These additional observations certainly indicate that histoplasmin sensitivity may persist for long periods, its durability apparently resembling that shown for tuberculin and coccidioidin.[1]

### GEOGRAPHIC DISTRIBUTION OF DOMINANT HISTOPLASMIN SENSITIVITY

Early in the war a large proportion of the personnel of the San Joaquin Valley Army Air Fields was recruited locally. However, by 1945 when the histoplasmin was used routinely with coccidioidin, transfers had shuffled the personnel so effectively that we had a fair representation from most of the United States. This fact permitted us to study the geographical distribution of dominant histoplasmin sensitivity. All of these 3,376 histoplasmin tests were in adults. Two hundred and three were in women, 306 were in Negro males, and 2,767 in white males. The place where sensitization to histoplasmin was presumed to have been acquired was ascertained by asking for the "home state" and "home county." Our rosters also carried beside each name the state of birth. When the soldier's home state and state of birth did not coincide, he was asked further questions as to his residence. If he had lived in a number of states, no attempt was made to tabulate a state for him. Also, if his histoplasmin was positive and he had spent over 3 months in a central state or the Panama Canal Zone, no allocation was made. In our own experience very

TABLE 3

*Percentage of Histoplasmin Reactors by States of Residence*

*Survey of Army Airforce Personnel Compared with Other Surveys*

| | Current Survey | | | Palmer [22] | | | Christie-Peterson [18] | | | Other Studies | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Positive | | | Positive | | | Positive | | | Positive | |
| | No. Tested | No. | % | No. Tested | No. | % | No. Tested | No. | % | No. Tested | No. | % |
| United States | 3,264 | 788 | 24.1 | 8,141 | 1,699 | 20.9 | 1,255 | 720 | 57.4 | .. | .. | .. |
| 1. Alabama | 41 | 17 | 42 | 26 | 6 | 23 | 77 | 36 | 47 | 1,200 Negro | | 15* |
| | | | | | | | | | | 923 White | | 4* |
| 2. Arizona | 2? | 0 | .. | 20 | 1 | 5 | 1? | 0 | .. | .. | .. | .. |
| 3. Arkansas | 60 | 30 | 50 | 34 | 18 | 53 | 19? | 9 | 47 | .. | .. | .. |
| 4. California | 301 | 0 | 0 | 1,195 | 67 | 6 | 5? | 1 | .. | .. | .. | .. |
| 5. Colorado | 57 | 0 | 0 | 460 | 4 | 1 | 1? | 0 | .. | .. | .. | .. |
| 6. Connecticut | 27 | 0 | 0 | 8? | 0 | .. | 4? | 3 | .. | .. | .. | .. |
| 7. Delaware | 4? | 0 | .. | 6? | 0 | .. | 0? | .. | .. | .. | .. | .. |
| 8. Dist. Columbia | 11? | 5 | 46 | 31 | 14 | 45 | 2? | 0 | .. | .. | .. | .. |
| 9. Florida | 38 | 1 | 3 | 70 | 3 | 4 | 30 | 6 | 20 | .. | .. | .. |
| 10. Georgia | 57 | 6 | 11 | 23 | 0 | 0 | 43 | 5 | 12 | .. | .. | .. |
| 11. Idaho | 35 | 0 | 0 | 12? | 0 | 0 | 0? | .. | .. | .. | .. | .. |
| 12. Illinois | 195 | 80 | 41 | 67 | 24 | 36 | 13? | 3 | 23 | .. | .. | .. |
| 13. Indiana | 71 | 47 | 66 | 38 | 25 | 66 | 11? | 6 | 55 | .. | .. | .. |
| 14. Iowa | 93 | 38 | 41 | 132 | 29 | 22 | 1? | 0 | .. | .. | .. | .. |
| 15. Kansas | 73 | 37 | 51 | 408 | 159 | 39 | 2? | 1 | .. | .. | .. | .. |
| 16. Kentucky | 36 | 27 | 75 | 22 | 17 | 77 | 56 | 47 | 84 | .. | .. | .. |
| 17. Louisiana | 52 | 22 | 42 | 326 | 70 | 22 | 11? | 4 | 36 | .. | .. | .. |
| 18. Maine | 12? | 0 | 0 | 4? | 0 | 0 | 0? | .. | .. | .. | .. | .. |
| 19. Maryland | 28 | 6 | 21 | 502 | 154 | 31 | 3? | 1 | .. | .. | .. | .. |
| 20. Massachusetts | 65 | 0 | 0 | 17? | 3 | 18 | 2? | 0 | .. | .. | .. | .. |
| 21. Michigan | 91 | 14 | 15 | 598 | 49 | 8 | 6? | 1 | .. | .. | .. | .. |
| 22. Minnesota | 90 | 3 | 3 | 937 | 38 | 4 | 1? | 0 | .. | .. | .. | .. |
| 23. Mississippi | 63 | 30 | 48 | 71 | 20 | 28 | 32 | 19 | 59 | .. | .. | .. |
| 24. Missouri | 149 | 122 | 82 | 389 | 310 | 80 | 11? | 8 | 73 | 610 | .. | 79† |
| 25. Montana | 35 | 0 | 0 | 23 | 0 | 0 | 0? | .. | .. | .. | .. | .. |
| 26. Nebraska | 46 | 2 | 4 | 159 | 12 | 8 | 0? | .. | .. | .. | .. | .. |
| 27. Nevada | 7? | 0 | .. | 16? | 3 | 19 | 0? | .. | .. | .. | .. | .. |
| 28. New Hampshire | 6? | 0 | .. | 4? | 2 | .. | 1? | 0 | .. | .. | .. | .. |
| 29. New Jersey | 69 | 1 | 1 | 42 | 1 | 2 | 61 | 5 | 8 | .. | .. | .. |
| 30. New Mexico | 21 | 0 | 0 | 50 | 5 | 10 | 1? | 0 | .. | .. | .. | .. |
| 31. New York | 253 | 14 | 6 | 88 | 8 | 9 | 76 | 8 | 11 | .. | .. | .. |
| 32. N. Dakota | 47 | 2 | 4 | 37 | 1 | 3 | 12? | 4 | 33 | .. | .. | .. |
| 33. N. Dakota | 25 | 0 | 0 | 88 | 1 | 1 | 0? | .. | .. | .. | .. | .. |
| 34. Ohio | 141 | 63 | 45 | 762 | 459 | 60 | 9? | 5 | .. | 5,087 | .. | 47‡ |
| | | | | | | | | | | 170 | 76 | 45¶ |
| 35. Oklahoma | 79 | 26 | 33 | 40 | 15 | 38 | 9? | 4 | .. | .. | .. | .. |
| 36. Oregon | 48 | 0 | 0 | 7? | 0 | .. | 1? | 1 | .. | .. | .. | .. |
| 37. Pennsylvania | 201 | 40 | 20 | 883 | 121 | 14 | 39 | 8 | 21 | .. | .. | .. |
| 38. Rhode Island | 15? | 0 | 0 | 1? | 0 | .. | 0? | .. | .. | .. | .. | .. |
| 39. S. Carolina | 40 | 4 | 10 | 11? | 0 | 0 | 27 | 4 | 15 | 121 | 1 | 1‖ |
| 40. S. Dakota | 33 | 2 | 6 | 96 | 1 | 1 | 0? | .. | .. | .. | .. | .. |
| 41. Tennesse | 58 | 44 | 76 | 10? | 4 | 40 | 611 | 505 | 83 | .. | .. | .. |
| 42. Texas | 197 | 78 | 40 | 61 | 21 | 34 | 27 | 7 | 26 | .. | .. | .. |
| 43. Utah | 34 | 0 | 0 | 15? | 1 | 7 | 0? | .. | .. | .. | .. | .. |
| 44. Vermont | 6? | 0 | .. | 1? | 0 | .. | 0? | .. | .. | .. | .. | .. |
| 45. Virginia | 48 | 16 | 33 | 48 | 7 | 15 | 15? | 5 | 33 | .. | .. | .. |
| 46. Washington | 81 | 0 | 0 | 16? | 0 | 0 | 1? | 0 | .. | .. | .. | .. |
| 47. West Virginia | 30 | 10 | 33 | 86 | 23 | 27 | 14? | 3 | 21 | .. | .. | .. |
| 48. Wisconsin | 80 | 1 | 1 | 122 | 2 | 2 | 2? | 0 | .. | .. | .. | .. |
| 49. Wyoming | 13? | 0 | 0 | 79 | 1 | 1 | 1? | 0 | .. | .. | .. | .. |

Note: ? signifies less than 20 tested. No percentages calculated if less than 10 tests.

* Welch & Berry, Birmingham, Ala., children [29]

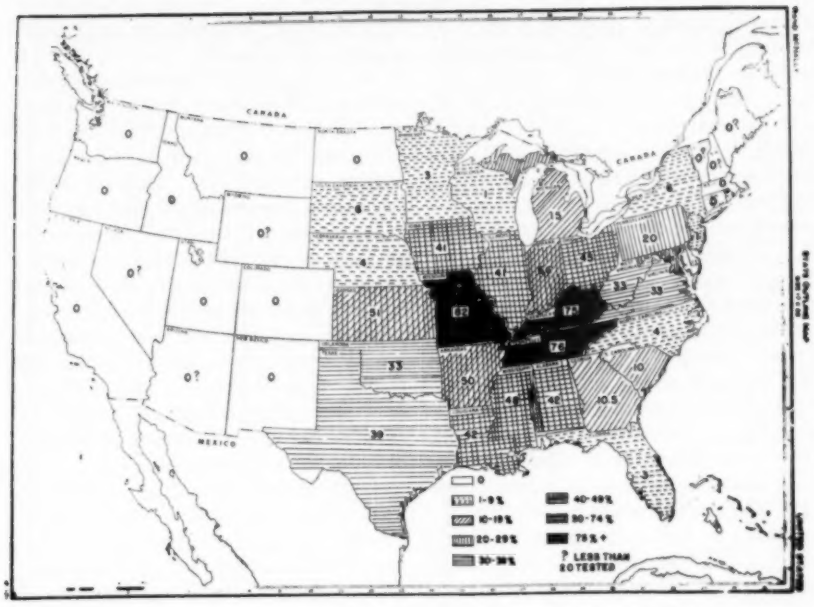
† Furcolow, High & Allen, Kansas City, Mo., Adult White Males [30]

‡ Prior & Allen, Ohio Univ. students [31]

¶ Sontag & Allen, Ohio children [32]

‖ Waring & Gregg, Charleston, S. C., children [33]

transient exposures have sufficed to provide coccidioidal infections. Mere automobile or train travel through an endemic area has resulted in infection. Therefore, we felt justified in not "crediting" histoplasmin sensitization to a "home state" where native sons who had been in constant residence




(Map reproduced by courtesy of Rand McNally & Co., Chicago.)

FIGURE 4—Percentage of Histoplasmin Reactors among Army Air Force Personnel Classified by States of Residence

showed no sensitivity while the few reactors had definite histories of residence elsewhere in areas with a high proportion of positive histoplasmins. The failure to allocate these reactors results in a somewhat lower percentage of reactions in the group in which allocation by states was made than in our overall tests. Of the 3,376 tested, 25.6 per cent reacted to histoplasmin. Of the 3,264 (111 fewer) in whom the allocation could be made to states, 24.1 per cent were reactors.

In Figure 4 we see the geographical distribution of dominant histoplasmin sensitivity by states. The numerical presentation in Table 3 also tabulates the findings of two other published surveys, that of Palmer's group of nurses [22] and that of Christie and Peterson's college group at Vanderbilt University.[18] The table also indicates certain published local surveys.[29-33] The surveys by Palmer and by Christie and Peterson agreed with ours in broad aspects. Table 4, presenting the states in order of their proportion of positives, emphasizes this agreement very strongly. Two other large "local" surveys also agreed closely. The Kansas City study by Furcolow, *et al.*[30] had 79 per cent reactors compared with our 82 per cent and Palmer's 80 per cent for Missouri. Prior and Allen's life-time Ohio residents (university and nursing students) [31] had 47 per cent reactors compared to our 45 per cent while Palmer's were somewhat higher, 60 per cent. In general, the states of the Missouri, Mississippi, Ohio, and Tennessee valleys had maximal incidence. The New England states and the Pacific Coast and Rocky Mountain states were free. Texas was notable, in that dominant histoplasmin sensitivity

TABLE 4

*Percentage of Histoplasmin Reactors in Three Reported Surveys with States Arranged in Descending Order of Proportion of Reactors*

| | Current Survey | | Palmer | | Christie | |
|---|---|---|---|---|---|---|
| | Rank | % Pos. | Rank | % Pos. | Rank | % Pos. |
| Missouri | 1 | 82 | 1 | 80 | 3? | 73 |
| Tennessee | 2 | 76 | 7? | 40 | 2 | 83 |
| Kentucky | 3 | 75 | 2 | 77 | 1 | 84 |
| Indiana | 4 | 66 | 3 | 66 | 5? | 55 |
| Kansas | 5 | 51 | 8 | 39 | ..? | .. |
| Arkansas | 6 | 50 | 5 | 53 | 6–7? | 47 |
| Mississippi | 7 | 48 | 13 | 28 | 4 | 59 |
| District of Columbia | 8? | 46 | 6 | 45 | ..? | .. |
| Ohio | 9 | 45 | 4 | 60 | ..? | .. |
| Louisiana | 10 | 42 | 16–17 | 22 | ..? | 36 |
| Alabama | 11 | 42 | 15 | 23 | 6–7 | 47 |
| Illinois | 12 | 41 | 10 | 36 | ..? | 23 |
| Iowa | 13 | 41 | 16–17 | 22 | ..? | .. |
| Texas | 14 | 40 | 11 | 34 | .. | 26 |
| Virginia | 15–16 | 33 | 18 | 15 | ..? | 33 |
| West Virginia | 15–16 | 33 | 14 | 27 | ..? | 21 |
| Oklahoma | 17 | 33 | 9 | 38 | ..? | .. |
| Maryland | 18 | 21 | 12 | 31 | ..? | .. |
| Pennsylvania | 19 | 20 | 19 | 14 | .. | 21 |
| Michigan | 20 | 15 | 21 | 8 | ..? | .. |
| Georgia | 21 | 11 | .. | 0 | .. | 12 |
| South Carolina | 22 | 10 | ..? | 0 | .. | 15 |
| South Dakota | 23 | 6 | .. | 1 | ..? | .. |
| New York | 24 | 6 | 20 | 9 | .. | 11 |
| Nebraska | 25–26 | 4 | .. | 8 | ..? | .. |
| North Carolina | 25–26 | 4 | .. | 3 | ..? | 33 |
| Minnesota | 27 | 3 | .. | 4 | ..? | .. |
| Florida | 28 | 3 | .. | 4 | .. | 20 |
| New Jersey | 29 | 1 | .. | 2 | .. | 8 |
| Wisconsin | 30 | 1 | .. | 2 | ..? | .. |
| California | .. | 0 | .. | 6 | .. | .. |

Note: ? signifies less than 20 tested. No percentages calculated if less than 10 tests.

was confined to the east and center, with its arid west and south, areas of coccidioidal endemicity, providing no dominant histoplasmin sensitivity. Our other attempts at allocation by counties were not revealing, as numbers were too small. We could not develop any significant figures for Arizona, for practically all of those claiming Arizona as their home reacted dominantly to coccidioidin. As we have seen, the histoplasmin cross-reactions in persons who have undergone coccidioidal infections are frequent. Doubtless this fact accounts for our major discrepancy with Palmer's findings, where he had 6 per cent reactors in Californian nurses. Moreover, his state breakdown gave Area II in the central section of California, which included a considerable amount of the coccidioidal endemic area, as 17.6 per cent reactors, compared with the low of 3 per cent in the northern part of California outside the coccidioidal endemic area.

The freedom of the Pacific Coast and Mountain states from dominant histoplasmin sensitivity is also supported by the absence of cases of histoplasmosis acquired in California. It is true that 2 cases of histoplasmosis have been reported from California. Tissue sections from the first reported case were thought to be Leishman-Donovan bodies but when they were sent to Meleney, he identified them as *Histoplasma*. The history as given by Crumrine and Kessel[34] stated that the patient was a Negro male who lived in the back country of Louisiana and worked in saw mills in Texas, moving to the Los Angeles area of California in the spring of 1927. The onset of his fatal illness was given as approximately October of 1927. Incidentally, his pulmonary x-rays showed

scattered calcifications. The second case was listed by Meleney [8] and reported by Martin and Silber.[35] We are indebted to Meleney [36] for the information that this patient was born in Tennessee and had been in the Los Angeles area 4 years before death. As she was a diabetic, alcoholic and morphine addict, and had had staphylococcal abcesses in various parts of her body several years before her final illness, the duration of her histoplasmosis would seem uncertain. Indeed, Meleney in writing us mentioned that he had just reviewed the sections of the adrenal where organisms had been noted and found an area of calcification therein which had been overlooked previously. He commented: ". . . the calcification is interesting in connection with the recent developments in histoplasma infections."

We recovered *Histoplasma* from a sinus tract on the thorax of a veteran in a California veterans' hospital, but he had come from Arkansas. Another patient from whose buccal lesions Johnstone recovered *Histoplasma* at the University of California Hospital [37] had lived in the central states. With physicians, and especially pathologists, conditioned by coccidioidomycosis to be on the alert for mycotic infections, it seems unlikely that any significant amount of fatal but undetected histoplasmosis would be occurring in California. The fact that a few cases of histoplasmosis have been detected, all traceable to the central states, is further evidence against failures of diagnosis. It would clarify matters if future tabulators of the geographical distribution of reported cases of histoplasmosis would at least indicate the possibility that the cases reported from California were acquired in the central United States.

The freedom of the New England area was commented on by Parsons and Zarafonetis [38] in their 1945 review of 71 cases of histoplasmosis. Noting that over half of these cases had been reported from states lying along the Mississippi River and its main tributaries (Michigan being the sole exception), they added: "We are unable to attribute definite significance to the facts or fact that *no* cases have been reported from the New England states." The same aspects of geographic localization of histoplasmosis in the United States have been borne out by more recent reviews of reported cases.[39, 40]

A small number of soldiers, 17 in all, had been born in Europe and spent some years there. All were histoplasmin-negative. One member of the Women's Army Corps from Puerto Rico was positive. Five histoplasmin reactors with home states (California, Connecticut, Idaho, Maine, Washington) outside the histoplasmin endemic area of the continental United States and without residence or service in it, had two or more years of Army service in Panama. One naturally recalls that the site of Darling's discoveries was Panama and that recently Tomlinson and Grocott reported the recovery of *Histoplasma* from a dog of the Canal Zone.[41] Two years ago a 7 year old child was examined for admission to Stanford Convalescent Home. A lesion in his pulmonary roentgenogram was thought to be a primary tuberculous focus, but his Mantoux test was negative. His histoplasmin was four-plus. His entire 2 years' residence in the United States was in San Francisco, and he had come directly from San Salvador where he had been born.[42] Certainly, Central America would seem to offer excellent opportunities for the study of histoplasmin sensitivity and pulmonary calcifications in non-reactors to tuberculin.

Admittedly, distribution of histoplasmin sensitivity is not proved to be the exclusive result of infection by *Histoplasma capsulatum*. The published [17–20] and unpublished [43] studies by Christie, Peterson, and McVicars at Vanderbilt, and the reports by Bunnell and Fur-

colow[27] do provide evidence increasingly incriminating *Histoplasma* as one very important element. While Groover, *et al.*[26] reported inability to demonstrate *Histoplasma* in bone marrow, sputum or lymph nodes of 7 strong reactors to histoplasmin, negative to cocidiodin and tuberculin, such recoveries would not have been anticipated. Comparable coccidioidin reactors, even with residual pulmonary lesions, would not have *Coccidioides* recoverable by similar procedures unless they had pulmonary cavities. The critical studies of Emmons, Olson, Bell, and their associates,[23, 28] while indicating the potential usefulness of histoplasmin, have emphasized the necessity of its careful evaluation, especially with respect to association with pulmonary calcification. In this regard it is noteworthy that one-third of the 102 Ohio children with pulmonary calcifications studied by Sontag and Allen[32] reacted neither to histoplasmin nor to tuberculin.

Certainly, the geographic distribution of histoplasmin sensitivity indicates the presence of a specific cause or causes, themselves occurring in restricted areas. Sensitization by a widespread fungus like *Candida albicans*[44] or by penicillin,[26] while theoretically possible because of cross-reactions which have been demonstrated, does not offer a very plausible explanation since geographic localization would be unexplained. However, the fact that histoplasmin reacts so frequently in coccidioidal infections and that there is such marked cross-reaction with experimental blastomycosis indicates the possibility of sundry mycotic infections.

Recently W. L. Potts, Medical Director of Franklin County (Ohio) Tuberculosis Hospital[45] informed us of 3 patients who had never left Ohio and who reacted to coccidioidin but not to histoplasmin. Knowing that *Coccidioides* does not occur naturally in Ohio, we must assume either exotic coccidioidal infections or the existence of another mycotic infection which, at least occasionally, evokes cross-reactions to coccidioidin. Certainly it is theoretically possible for other mycoses to produce infections with cross-reactions to histoplasmin. However, if histoplasmin sensitivity is the result of infections by several agents, these infections must still be restricted in distribution to account for the geographical distribution of histoplasmin sensitivity. Moreover, while the infection spectrum[4] of coccidioidal infections indicates that 60 per cent are completely inapparent, the infection or infections responsible for histoplasmin sensitivity are even less manifest.

Thus far, despite diligent searches, the etiology of the only reported clinically apparent infections associated with dominant histoplasmin sensitivity have been by *Histoplasma*.[20, 27] The search must continue and, in the meantime, assumption that histoplasmin sensitivity proves an infection by *Histoplasma* is uncritical. Fortunately, from a diagnostic point of view, coccidioidin has proved much more specific, though, as we have seen, it has its definite limitations when used singly. A "battery" of several skin testing agents used at their appropriate "critical titers"[24] may be advisable, although every attempt should be directed to obtaining purified and specific material.

SUMMARY

Simultaneous coccidioidin and histoplasmin skin tests were performed on normal military personnel and others undergoing coccidioidal infections using 1:100 coccidioidin and either 1:100 histoplasmin from Christie and Peterson (Vanderbilt University) or 1:1,000 histoplasmin from Emmons (National Institute of Health). Among 3,376 healthy persons negative or equivocal to coccidioidin, 26 per cent reacted dominantly to histoplasmin. Equivocal and

occasionally positive coccidioidin reactions in individuals who had no opportunity of acquiring coccidioidal infections were found exclusively in the group of histoplasmin reactors. The stronger the histoplasmin sensitivity, the more frequent and larger the nonspecific reactions to coccidiodin. The nonspecific coccidioidin reactions were not so great as to interfere with interpretation, especially when interpreted in the light of the reaction to appropriate dilution of histoplasmin. However, if strong (1:10) coccidioidin was used as it must in some forms of coccidioidal infections, the hazard of a positive nonspecific reaction was considerable.

The histoplasmin test in dominant coccidioidin reactors showed a much higher degree of cross-reaction. In 31 persons negative both to coccidioidin and histoplasmin, subsequent coccidioidal infections evoked sensitivity and concomitantly positive histoplasmin as well as coccidioidin reactions. Simultaneous blastomycin, histoplasmin, and coccidioidin tests in patients undergoing coccidioidal infections showed nonspecific cross-reactions of the blastomycin and histoplasmin approximately to the same degree. Again, the greater the sensitivity to coccidioidin, the greater the frequency and the size of the cross-reaction. Comparisons between the two histoplasmins used showed no significant difference in specificity, but the 1:1,000 N.I.H. histoplasmin was equivalent to 1:100 Vanderbilt material. If the former was used in 1:100 dilution, it frequently evoked larger reactions in coccidioidal patients than did 1:100 coccidioidin.

The presence of histoplasmin sensitivity in 6 persons who had been outside the area of dominant histoplasmin sensitivity for 10 years, with 3 longer than 20 years, bespoke its persistence.

The geographic distribution of dominant histoplasmin sensitivity disclosed reactions in four-fifths of those from Missouri, three-fourths from Tennessee and Kentucky, and concentric diminutions of positives until the New England, Rocky Mountain, and Pacific Coast states appeared virtually devoid of reactors. This was in close agreement with other studies. It indicated extensive inapparent infection, probably by *Histoplasmin capsulatum*, with or without some additional fungus or fungi with which histoplasmin cross-reacts extensively.

Histoplasmin appears to have limitations due to its cross-reactions, but used in appropriate relative strength, it, and coccidioidin, are valuable in the diagnosis and epidemiological investigation of pulmonary lesions.

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# Isolation of the Virus of Newcastle Disease from Human Beings

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NEWCASTLE disease (Avian Pneumoencephalitis) is one of the more recent diseases affecting poultry in the United States. In young birds it produces respiratory and nervous symptoms, whereas in older birds the symptoms are primarily of a respiratory nature. The causative agent is a filtrable virus which closely resembles human influenza virus A & B. (Burnet [1]).

In the United States the Virus has attacked primarily chickens and turkeys; however, all of the common barnyard fowls are susceptible. In 1947, Reagan and coworkers [2-4] showed that the virus was adaptable to certain mammals such as the Syrian hampster and Rhesus monkey by the intracerebral route. Mice, guinea pigs, and rabbits were relatively resistant.

The first report of this disease in fowls was by Kraneveld in the Dutch East Indies in 1926, and the following year Doyle reported the isolation of the causative agent at Newcastle-on-Tyne in England. Since that time it has spread over many countries throughout the world. Earliest reports on its occurrence in the United States were by Beach in California in 1941.

The disease as observed in the United States has differed from that encountered in other countries in that the mortality has been low in adult birds, whereas in other countries it has been almost 100 per cent.

Although much has been written about Newcastle disease in poultry, only six reports in literature mention its occurrence in human beings. Of this number only two mention the recovery of the virus. In 1943 Burnet [5] described a laboratory infection (conjunctivitis) due to the accidental entrance of live virus into the human eye. Anderson,[6] in 1946, reported two other laboratory infections of man in Australia. All patients showed a conjunctivitis, and Newcastle virus was recovered from the tears.

Shimkin,[7] in 1946, recorded a case of conjunctival hemorrhage in a worker at the Government Poultry Laboratory in the northern district of Palestine. While circumstantial evidence seemed to indicate Newcastle virus as the causative agent, virus isolation was not reported. During the same year a small epidemic of contact infection by Newcastle virus occurred in employees at the Agricultural School, Mikveh, Israel, where an outbreak was occurring in the poultry flock. The cases were confined mostly to women kitchen personnel.

Howitt [8] and coworkers reported on the presence of neutralizing antibodies of Newcastle disease virus in human sera in the United States. McGough,[9] in 1949, also reported the presence of Newcastle neutralizing antibodies in sera of human beings who had become ill following the ingestion of cooked chicken. However, as far as is known, no reports have been made of the recovery of Newcastle disease virus from any human infections in the United States. Since there is a marked differ-

ence in the disease as it occurs in the United States compared to other countries, it appeared desirable to offer the following reports of recovery of the virus from apparently infected human beings in Ohio.

A broiler plant operator, P. N., brought several chickens to the Poultry Diagnostic Laboratory, College of Veterinary Medicine, Ohio State University on October 19, 1948, for diagnostic purposes. The history and symptoms shown by the birds were indicative of Newcastle disease. This was confirmed by isolation of the virus and hemagglutination inhibition (H.I.) techniques. It was noticed that the flock owner had a definite conjunctivitis of the left eye. Upon questioning, he stated that the condition had been observed 3 days after the sickness was noticed in his flock and had been present for 3 days but was now apparently improving. Gross examination revealed edema of the lids, marked hyperemia of the scleral and conjunctival vessels, and a definite mucopurulent discharge. No general symptoms had been noted, and medical aid had not been employed.

METHODS OF VIRUS ISOLATION

With his permission, a sterile cotton swab was placed in the medial canthus of the affected eye; and the recovered exudate placed in 1 ml. of sterile nutrient broth and incubated at room temperature for approximately 30 minutes. The material was frozen at — 18° C. and held under this refrigeration for 7 days until fertile hen's eggs of the proper stage of incubation were available. The material was then thawed and treated with approximately 5,000 units each of penicillin and streptomycin and left at room temperature for 30 minutes. Three fertile hen's eggs incubated at 37° C. for 9 days were each inoculated into the allantoic cavity with 0.15 ml. of the supernatant fluid. The shell openings were sealed with paraffin and the eggs further incubated at 37° C. Each of the embryos was dead on the morning of the third day following inoculation. Material from the dead embryos transferred to blood agar medium failed to show bacterial growth. Using the methods recommended by the B.A.I.,[10] cell-free allantoic fluid from the dead embryos agglutinated fowl red cells; and agglutination was inhibited specifically by anti-Newcastle-disease virus immune serum.

Three fertile hen's eggs incubated at 37° C. for 9 days were each inoculated with the stock solution of the antibiotics. All embryos remained alive and active, and the mixture was considered to be free of the virus.

Using techniques recommended by the B.A.I.,[11] the titer of the virus as determined by egg embryo inoculations was found to be $10^{-7}$. Serum neutralization tests were indicative of Newcastle virus.

Two susceptible cockerels (H.I.-negative) approximately 6 months old and one Newcastle vaccinated hen (H.I.-positive) were inoculated with the above virus. Four days later a very slight respiratory involvement (moist rales) was noted in the 2 negative cockerels, whereas the vaccinated bird revealed nothing. Blood drawn from these birds 10 days after their injection was strongly positive on H.I. tests in all 3 birds.

A blood sample from P. N. approximately 1 month after having the conjunctivitis revealed strongly positive H.I. titer. No neutralization tests were conducted on this sample.

Virus from the original isolation was sent to the Pathological Division of the Bureau of Animal Industry in Washington for final confirmation. Their report is shown in Table 1.

A junior veterinary student, R. M., autopsied 1 chicken having a history and symptoms suggestive of acute Newcastle disease on November 21, 1948, and 2 chickens with symptoms of acute

TABLE 1

| | $10^1$ | $10^2$ | $10^3$ | $10^4$ | $10^5$ | $10^6$ | $10^7$ | $10^8$ | $10^9$ |
|---|---|---|---|---|---|---|---|---|---|
| N. Virus | | | | | 3/3 | 3/3 | 3/3 | 1/3 | |
| Newcastle Disease Antiserum | 0/3 | 0/3 | 0/3 | 1/3 | | | | | |
| Normal Avian Serum | | | | | 3/3 | 3/3 | 2/3 | 1/3 | |

Newcastle disease on November 22, 1948. The diagnoses on these cases were confirmed by isolation of the virus and H.I. techniques. On the evening of November 23, 1948, his wife called his attention to a redness and swelling of his right eye; however, the condition did not seem painful. The following day he placed bichloride of mercury ointment in the affected eye and attended classes. Gross examination at that time revealed edema of the lids and hyperemia of the scleral and conjunctival blood vessels. Dr. Maurice L. Zox of the Student Health Service, Ohio State University, who examined the eye, described the conjunctivitis as "a granular type involving the palpebral conjunctiva." A sterile swab was placed in the medial canthus of the eye and gently moved laterally along the lower lid; and this material was then placed in 1 ml. sterile nutrient broth, to which 5,000 units each of penicillin and streptomycin were added. The mixture was incubated at room temperature for 30 minutes and was injected into 4 fertile eggs which had been incubated at 37° C. for 9 days. Two embryos died on the third day following inoculation; and the allantoic material was reinoculated into 4 12 day old incubated eggs. Forty-eight hours later all embryos were dead and the allantoic fluid was harvested. Material from the dead embryos transferred to blood agar medium failed to show bacterial growth. Cell-free allantoic fluid from the dead embryos agglutinated fowl red cells, and agglutination was inhibited specifically by anti-Newcastle disease virus immune serum.

The titer of the virus isolated, as determined by egg inoculation, was $10^{-8}$, and serum neutralization was indicative of Newcastle virus. Serum neutralization tests conducted by the Pathological Division of the Bureau of Animal Industry on virus from the original isolation confirmed our diagnosis of Newcastle virus and gave the following results (Table 2).

TABLE 2

| | $10^1$ | $10^2$ | $10^3$ | $10^4$ | $10^5$ | $10^6$ | $10^7$ | $10^8$ | $10^9$ |
|---|---|---|---|---|---|---|---|---|---|
| N. Virus | | | | | 3/3 | 3/3 | 3/3 | 3/3 | 1/3 |
| Newcastle Disease Anti-serum | 0/3 | 0/3 | 0/3 | 0/3 | | | | | |
| Normal Avian Serum | | | | | 3/3 | 3/3 | 3/3 | 3/3 | 1/3 |

The conjunctivitis persisted for 1 week in the student and gradually disappeared. No ill effects were noted other than a mild irritation which continued for 3 days after the onset.

## SUMMARY

Two natural occurring cases of conjunctivitis thought to be due to the virus of Newcastle are reported. One case occurred in a broiler plant operator on whose premises Newcastle disease was in progress; and the second case was a veterinary student who, in the course of his clinical work, autopsied 3 chickens affected with acute cases of Newcastle disease. In the broiler plant operator, the virus identification was confirmed by hemagglutination, hemagglutination inhibition, serum neutralization techniques, and antibody response in chickens.

In the case of the student the virus identification was confirmed by hemagglutination, hemagglutination inhibition, and serum neutralization.

In addition to the above, virus sent to the Pathological Division, U. S.

Bureau of Animal Industry was identified as Newcastle virus.

This is believed to be the first reported case of the isolation of the virus of Newcastle disease from man in the United States.

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ACKNOWLEDGMENTS: The authors wish to acknowledge the coöperation of George W. Butz, M.D., Practioneer, Swanton, Ohio; Maurice L. Zox, M.D., of the Student Health Service, Ohio State University; and Dr. L. T. Giltner, of the Pathological Division of the U. S. Bureau of Animal Industry, Washington, D. C.

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# Public Health Degrees 1947–1948

The January, 1949, issue of the *American Journal of Public Health* carried the Report on Public Health Degrees and Certificates which has been compiled by the Committee on Professional Education annually for the past 15 years. As in previous years, the report on the academic year 1947–1948 contains valuable information on enrollment, the professional backgrounds of the students, the degrees offered and the degrees granted by the various universities. Because of the special concern which the Engineering Section Project has had in training of engineers and sanitarians, the material this year is more complete than previously with respect to the postgraduate degrees in sanitary and public health engineering; in addition the findings of a special study on undergraduate students and degrees in engineering and sanitation are included. Two summary tables only were published in the January *Journal*. A set of 10 additional detailed tabulations in multilith form is available free on request from the office of the Association.

# Morbidity Surveys

## The Morbidity Survey in Public Health Work *

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THE methods of measuring the characteristics, habits, and opinions of representative samples of our people have advanced rapidly in recent years. We have been learning to use what people have to say about themselves and their families, not only to satisfy the public's curiosity about itself but also to supply the needs of government and business planning and scientific research. It is natural, therefore, that we should be hearing more and more about plans to use the layman as an informant for acquiring data on morbidity in the general population. The idea is not new to public health people. In this country morbidity surveys based upon house-to-house canvasses date back to before the beginning of this century. But the supply of new information from this source is by no means keeping up with the demand. In the field of public health we are seriously hampered by lack of up-to-date and reliable figures on illness rates, the need for medical care, and the facilities for supplying it.

Certainly one of the reasons why the morbidity survey has not been used more frequently is the cost of this type of work, which is by no means trivial. Yet the amount of money required is no greater than is now spent to secure facts about the labor force or about livestock, or corn, wheat, and cotton crops. But when there is public recognition of this unbalanced state of affairs, shall we be ready with knowledge of how best to plan a survey—a survey that will combine what we have learned from past projects of this type with the new techniques of interviewing developed in the field of attitude research and with the rapid advances that have been made in population sampling methods? And do we know just what types of statistical data the health officer and epidemiologist most need? Have we, in fact, even convinced them that information on illness provided by these surveys is of value?

If we define a morbidity survey as it is ordinarily understood, as "any canvass of households or individuals for the purpose of collecting statistics on illness and closely related subjects, such as medical care and public health," that definition does not restrict the manner of selection of respondents nor the type of respondents to be used. They may be physicians asked about their patients, housewives asked about the members of their households, or individuals asked about themselves. In fact, the canvass may not involve an interview at all. It may depend instead upon the use of some diagnostic procedure, such as a physical examination, an x-ray, a blood test, or a blood-pressure reading. Whether this last type of investigation falls under the heading of a morbidity

* Excerpts from the remarks of the moderator in opening the Panel Discussion on Morbidity Surveys before a Joint Session of the Biometrics Section of the American Statistical Association, Biometrics Society, and the Statistics Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 10, 1948.

survey, is open to some question, but it is certainly worth bearing in mind that this is the *only* type of canvass that will provide information on illness of which the individual himself is unaware.

Another sort of inquiry is that in which the information is secured from a physician, or from hospital or clinic records. This type may be very important, since in some situations nothing less than a professional opinion can be used. An example would be the cancer surveys of the sort carried out by the National Cancer Institute.

The three kinds of survey I have specifically mentioned correspond to three levels of awareness of illness. The diagnostic survey is the only one that can pick up illness of which the individual is unaware. The household survey or survey of individuals in the general population can only catch illness which the sick individual recognizes, but it can be made to cover unattended as well as attended cases. On the other hand, the doctor as an informant can only give information about illness that has been brought to his attention, that is, attended illness.

The topic of this panel discussion is restricted to morbidity surveys in which individuals are asked about their own health or the health of other members of their household, and which make use of diagnostic techniques and medical records only as validation or extension of the information obtained from such informants. This sort of survey has been singled out for discussion because it is the one which seems to hold out the most immediate hope for supplying us with additional estimates of the incidence and prevalence of illness which we so badly need.

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## Pre-Engineering Inventory

Recognizing the need for guidance to students about to enter college, the Engineers' Council for Professional Development has prepared a pamphlet, *Pre-Engineering Inventory,* to give advice to those students who may be contemplating the field of engineering. Discussion of this activity is contained in the 16th annual report of ECPD now being distributed. According to the report, 20,000 copies of *Pre-Engineering Inventory* have been distributed to various universities, high schools, preparatory schools, etc. A companion report, *Engineering as a Career,* found sales for another 20,000 copies during the year 1948–1949. The annual report summarizes the first year of accreditation following the disruption of the program during the war years. During the year 1947–1948, 40 institutions were visited where 125 curricula were reinspected and 46 were inspected for the first time for the purpose of accreditation. ECPD is located at 25 West 39th Street, New York 18.

# Morbidity Surveys

## Planning the Morbidity Survey *

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IN planning the type of morbidity survey we are discussing this morning there are a number of decisions that have to be made. Each of these decisions is influenced by the particular purpose which the survey is to serve. Hence, it is first necessary to have that purpose clearly in mind. There should be one objective to which all others are secondary, and the survey should be designed with this major objective in view.

The preliminary decisions that have to be made can be grouped under three headings:

1. Defining the things we want to measure.

2. Defining the sample, including the units of sampling, the method of selection of the units, the method of estimating from the sample, and the sort of sampling error expected from this sampling plan.

3. Defining the interview, how it is to be conducted, who is to be considered an acceptable informant for the various persons in a household unit, who will do the interviewing and how the questions will be asked.

In this last category, also, we might place the decisions on the types of validation that we shall try to get; not only the validation of diagnostic and other information given us in the interview but also the tests of interviewer consistency and of the degree of understanding that exists between interviewer and informant. These are difficult things to tackle, but at our present stage of knowledge of morbidity survey techniques they are highly necessary.

In order that our sampling statisticians may design the best possible samples for us, we must supply them with as much information as possible about how morbidity rates vary. We are particularly short of statistics showing the geographical variation of morbidity. Such information is needed by the sampling man in order that he may determine whether it is necessary to spread the sample to many areas or whether it can be concentrated in a relatively few areas, thus cutting down the cost.

The sampling problems are by no means independent of the problems relating to definition of desired measures and design of interview. For example, if the primary interest is in measuring the amount of chronic disease in the population, we should prefer to visit a large number of households even if we visited each household only once. On the other hand, if our chief concern is with the acute communicable diseases, we shall do better to select fewer households and visit them repeatedly since we can obtain the same number of person-years of experience and more accurate information on date of onset

* Excerpts from remarks presented at a Joint Session of the Biometrics Section of the American Statistical Association, Biometrics Society, and the Statistics Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 10, 1948.

and duration at a lower cost. Obviously, therefore, the matter of where the chief emphasis is to be placed affects the sample design.

In the Public Health Service we feel that we have now acquired a good deal of experience in working with the various measures of morbidity, incidence, prevalence, average duration, and the like. We have learned quite a lot about the interrelationships of disabling and non-disabling illness, bed illness, hospitalized illness, numbers of visits by doctors and nurses, classification of illness, and so on, and about the age-sex variation of these measures in specific communities. We have made the least progress in solving the problems relating to the interview itself. It is hard to frame objective questions to bring out illness that has not been attended by a doctor and has not been disabling in some specific manner, such as requiring the man to stay home from work or the child to stay home from school. Most serious chronic diseases that are recognized by the individual have at one time been attended by a doctor. If they had not been attended, then the individual usually would not know what he had anyway.

But what about the unattended, non-disabling illnesses? The individual is certain that he has been sick or is sick, but he has not seen a physician, and he still keeps on with his work. There is a lot of illness that comes under this heading. Surveys on the common cold alone prove that. Some of it is illness which *would* be attended under a system of prepaid medical care. Although some of it is minor, some of it may represent the unrecognized onset of a serious disease. The person may have been suffering from symptoms which he does not know how to diagnose himself and for which he has never yet consulted a physician nor taken any sick leave from his job. Are we to let this unattended and non-disabling illness go? If not, we are surely going to be involved in some intricate problems of attitude measurement, or something closely akin to attitude measurement.

Perhaps the health officer and epidemiologist will tell us that such illness is too ill-defined to be worth bothering about, but if it is determined to be part of what we want to measure, then we particularly need the help of the attitude research people to teach us how to frame our questions.

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# Life Insurance Medical Research Fund 1949 Grants

Early in March the Life Insurance Research Fund made grants totaling $585,000 to 35 universities and research centers in the United States and Canada for 53 different heart disease research projects. It also allocated $95,000 for the support of 18 graduate and 9 undergraduate research fellows who will work under the supervision of experienced investigators. One student will work in the Zurich, Switzerland, Pharmacological Institute.

The Research Fund at the same time announced the following additions to its professional advisory council:

Alfred Blalock, M.D., Johns Hopkins University
William S. Middleton, M.D., University of Wisconsin
Max M. Wintrobe, M.D., University of Utah

# Morbidity Surveys

## A Morbidity Survey of the Population *

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CERTAIN of the problems which arise in surveying morbidity are general; they are identical with those of surveys of the labor force, of blood types, of potato production. Other problems are specific to morbidity. Separation of these two groups has the advantage that we can bring to bear on investigations made by students of public health, experience gained in many other branches of statistical work. Since morbidity is not a field in which I have worked I can make a contribution, if at all, only in showing how the survey methods developed in other kinds of work may be applied in yours. I merely raise for your discussion one or two devices whose usefulness in other fields is now proved, and which have been brought into special prominence recently by the Sampling Sub-Commission of the United Nations.

Morbidity can be surveyed by asking questions of at least three different "units"—(a) households, (b) individuals, and (c) doctors. For any of these units a probability sample may be devised.

If households are the ultimate sampling unit they may be chosen at random among all the households of the country, or with some benefit in reduced variance, after division of the country into strata. This implies the existence of up-to-date lists for the whole country. If such lists are not available but good maps are to be had, one may choose certain large areas at first, then sample within these, etc., making the choice at random in each stage. Any sample which is to be visited should be concentrated in some fashion, so that the enumerators collectively will not have to travel over every part of the country; this method of concentrating it is known as area sampling and can be made unbiased so that every individual resident stands a known chance of inclusion. This was the type of sample used within cities in the pioneer effort of the National Health Survey in 1935–1936, conducted by the U. S. Public Health Service.

Some of the misunderstanding of the nature of sampling which has been prevalent during the past few years may have been cleared up by recent events. While it is often possible to select purposively those elements which seem most representative, or to obtain a sample by simply asking enumerators to fill quotas from among their friends or whoever else seems to them representative, yet any operation which proceeds in this manner involves very serious risk. If the man who designs the sample and oversees the tabulation has so close knowledge of the subjects that he can judge accurately what the population is like, it is indeed not necessary to have a probability sample. It happens, unfortunately, that one can never know whether the universe is as one thinks or different in respect of the subject of inquiry; this ignorance is why

* Excerpts from remarks presented at a Joint Session of the Biometrics Section of the American Statistical Association, Biometrics Society, and the Statistics Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 10, 1948.

one samples at all. The Sampling Sub-Commission of the United Nations was very emphatic in its last session that quota methods cannot be relied on.

After we have in some way selected a set of areas, we are up against the fact that when we go to the individuals in them with a set of questions we will find that they have only a vague and approximate idea of their state of health and morbidity. We can of course do better than was done in a morbidity survey with which I was associated; as part of the Canadian National Registration of 1940 everyone was asked what was the state of his health, and he replied good, fair, or bad, with no definition of these terms. The tabulation reporting that there were 539,340 Canadians in bad health, etc., was not a major contribution. If we sample doctors instead, and work from their files, we may get more specific returns; but these are only for those people who have visited doctors, and it is not easy to avoid giving double weight to those who have visited two doctors, etc.

The question of accuracy of individual response can most efficiently be handled by selection of a subsample to constitute a second phase of the investigation. From the second phase respondents additional information is obtained which will enable corrections to be made on the first phase. This is the common sense principle which is involved in any proper conduct of a census, for example, where a check is made on the original enumeration by some kind of sample, and ideally even a further check is made on the sample by a subsample.

Thus, the initial area sample, clustered for accessibility, stratified at each stage for efficiency, would survey morbidity on such diagnosis of ailments as individuals, or their mothers, wives, etc., are capable of making. We may even suppose these are subject to so great an error of reporting that totals based upon them would be entirely useless. The returns as obtained from this survey may then be sorted according to the "folk" diagnoses which were received. A small sample, stratified according to these diagnoses, consisting of one household out of twenty (the sampling proportion perhaps varying with the stratum, i.e., the ailment), would be visited by a doctor or public health nurse. This official would ascertain which of the persons having arthritis, etc., in their own estimation had it in his. These would be subject to an addition for the number having arthritis according to medical diagnosis who did not themselves state it. The result of the second phase would be a series of ratios of numbers, e.g., of persons having arthritis on medical opinion to numbers of persons thinking they had arthritis, which would be available for correcting the results of the first sampling.

This is a device which can be used to secure accurate diagnosis and reasonably high sampling precision when very few doctors or nurses are available for the job. A nice mathematical problem —for a simple case of which a solution has been presented—is to specify how much enumeration is required in the first phase and how much in the second phase, when we know, as the result of a small pilot survey, the cost of enumerating in each phase, the accuracy of reporting in the first phase, and the accuracy required in the final result.

# Morbidity Surveys

## The Contribution of the Survey Method to Epidemiology *

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MY remarks will be confined largely to the simple morbidity surveys conducted by trained, but non-medical, investigators who interview a sample of the general population. More complex surveys, utilizing professional personnel or laboratory diagnostic techniques, I shall class as special studies.

I accept a broad definition of epidemiology as the science concerned with understanding the factors related to the occurrence and distribution of disease in the population. Epidemiology must consider both the sick and the well in their relation to each other and to their environment.

The morbidity survey is a particularly useful epidemiological tool in that data on both the sick and the well are obtained concurrently. The problems arising from underreporting of cases, from arbitrary classifications of causes of death, and from unknown shifts of population between census years are largely eliminated.

Morbidity surveys are of special value in the study of the acute respiratory group of diseases and the chronic illnesses, for which routine sources of data are grossly inadequate or nonexistent. The survey method, however, is not restricted to these two groups of diseases, but may be applied to many illnesses. Its unique advantage lies in the detailed information that can be collected about the population. Frequency rates, specific for a wide variety of social and environmental factors, can be determined. Such comparisons are not obtainable by matching routine morbidity reports and death certificates with census figures.

The simple morbidity survey has one inherent limitation—only general data about disease can be obtained. The questions asked by the interviewers must be simple and understandable to the informants. Few specific diseases can be adequately counted by this method. Special studies are necessary to collect such definitive epidemiological information.

Therefore, the simple morbidity survey must be restricted to the study of broad groups of disease. We can expect from such surveys measures giving only gross orders of magnitude for prevalence, seasonal variation, and for the degree of disability, and correlations giving only limited associations with the specific social and environmental factors we can measure for the sample population.

These crude observations may be most valuable. They form the stuff from which new ideas generate. They make possible the formulation of epidemiological hypotheses. They are most useful in designing special studies.

* Excerpts from remarks presented at a Joint Session of the Biometrics Section of the American Statistical Association, Biometrics Society, and the Statistics Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 10, 1948.

In conducting morbidity surveys for epidemiological purposes, three points should be kept in mind:

1. The index for measuring the disease must be carefully chosen. The common striving to measure the total incidence of disease is a forlorn hope. Such an objective is contrary to the nature of disease itself. With rare exceptions, disease and health merge imperceptibly with each other. An index that is carefully defined and consistently followed is a first essential.

Indices vary in their usefulness. For example, it is of little value to learn that 10 per cent of a sample population said they had a cold last week. That is opinion. What is the definition of a "cold"? It is much more useful to learn that 3 per cent were in bed for one or more days with a cold last week. Such a figure is based on a definable index, understandable to the interviewer and to the informant alike. This index can be employed week after week in a consistent fashion. The results of one survey can be compared with another survey when such an index is used.

2. The choice of the sample population should be made with reference to the specific objectives of the study, rather than with the view to calculation of rates for the whole population. Such an extrapolation may be important in attempting to forecast an election or in estimating the overall need for medical care facilities. It has little basic value to epidemiology. To generalize from a sample implies an understanding of all the important factors influencing the occurrence of disease. If these were all known, there would be little epidemiological reason to conduct the survey. It is the function of epidemiology to elucidate the factors. Therefore, it is the internal comparisons within the sample that are important to epidemiology. The samples should be chosen to provide for the greatest differences in age, in crowding, in economic status, in environment, or whatever factors we wish to study. Such morbidity surveys provide the greatest opportunities for a better understanding of epidemiological problems.

3. Repeated surveys of the same individuals in the population provide more useful information than the single survey. The latter gives but a static measure at one moment. The former reveals the flow of disease through the community. It is from the study of these dynamic processes of disease that epidemiological understanding comes.

Through morbidity surveys, a small mountain of data can be collected with relative ease. Such data will be useful for epidemiological purposes if the questions asked be compatible with the inherent limitations of the method, if appropriate indices be selected for measuring disease, if the population sample studied be suitable to the questions involved, and if observations be maintained consistently and repeatedly over a period of time.

# Morbidity Surveys

## The Local Health Officer and Sickness Surveys *

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*Commissioner of Health of Baltimore City*

For confidence in statistics, like sausages, you must have knowledge of three things: Who made them, From what materials were they made, and For what purposes were they made.

From *Sir Arthur Newsholme,* 1921

THIS member of the panel, as a medical health officer, has been asked to discuss whether or not it may be desirable to make morbidity surveys a regular function of the health department; and further, whether the diagnostic material thus collected from lay informants would be reliable and valuable.

It is true that during the past fifteen years and more a good deal of this sort of information has been gathered in the Eastern Health District of Baltimore, especially with the aid of Dr. W. Thurber Fales, the City Health Department's Director of Statistics, and Dr. Lowell J. Reed and other coworkers in the Johns Hopkins School of Hygiene and Public Health. These cumulative family studies, based on repeated household inquiries, provide an unmatched backlog of information against which special health investigations may be placed for study. This has been done in syphilis, in tuberculosis, and for other health conditions. The Eastern Health District material was used by Jean Downes and Selwyn D. Collins as in their paper "A Study of Illness among Families in the Eastern Health District of Baltimore," in the *Milbank Memorial Fund Quarterly* of January, 1940. Such use of sickness survey material was of value to the Baltimore City Committee on Medical Care in laying the groundwork for the newly established Baltimore City Medical Care Program within the City Health Department. I am led to believe, however, that small scale local sample surveys compounded into a general national series of figures would be of little value on a local basis and that such small scale sampling surveys would probably not be desirable as a routine function of a local health department.

National figures, such as the monthly sickness surveys published by the British Ministry of Health, may have some meaning for the statistically minded, but for local interpretation they may be misleading in the way that a national weather forecast might be valueless when used on a local basis.

There is no doubt that the local health officer would welcome more exact information on the amount of illness, beyond the reported communicable disease cases, that occurs within his jurisdiction. He would like to know the types and causes and duration of such disabilities. He will do his best to cooperate with those who desire to make such investigations. However, he will be dubious about the reliability of "medical facts" and "diagnoses" provided by lay informers. For instance, when do common colds become an out-

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break of grippe, and when does a series of outbreaks of grippe become an epidemic of influenza, in the absence of a lively series of press releases resulting from some colds among the staff of the local newspaper, perhaps in November or February, when the temperature is changeable and it is wet underfoot? Or, when is poliomyelitis not poliomyelitis in the absence of paralysis or detectable muscle weakness?

Sir Arthur Newsholme and Dr. Otto Eichel, who was Dr. Hermann M. Biggs's statistical director in Albany, have taught us to be careful in our use of statistics, and Frost used to tell us in the 1930's that diphtheria might just be on a long-range decline, and that all the credit perhaps should not be given to the toxoid we were pumping into the children. On the other hand, Godfrey's studies of the statistics of measles have made it clear that the health officer must aim at preventing measles *deaths* under 3 years of age and not at preventing measles *cases* in school age, as earlier health officers vainly and mistakenly tried to do.

Let me close with some comments recently made by Dr. Charlotte Silverman on the need for care in interpreting the significance of the crude results of mass x-ray surveys of various local groups for tuberculosis control:

> "There are many confusing variables. They relate to the manner in which the groups are selected for mass radiography and the extent of participation of the group members; to the radiographic equipment employed; the extent to which reading of small films is supplemented by large films; to the skill and experience of the film reader; to the extent to which x-ray interpretation is supplemented by follow-up clinical and laboratory investigations; and, finally, to the criteria used in defining and classifying 'cases' of tuberculosis upon which rates and estimates are based. While mass radiography of the chest undoubtedly has its place in the epidemiologic attack upon tuberculosis, the values and limitations of this procedure have not yet been clearly delineated."

In spite of what has been said, this member of the panel wishes to state that he is enthusiastic for whatever will result in better planning and execution of morbidity surveys. However, he feels there is a real need for a clearer understanding of the many pitfalls that stand in the way of success in this difficult field of endeavor. Also, further consideration is needed in order that future surveys may be planned so as to be more useful to the local health official if he is expected to be an active collaborator in such survey efforts.

# How Processing Affects Nutritive Values of Grain Foods*

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SET a starving man down in a vegetable garden and he could quickly stay his hunger; but set him down in a field of wheat—and he would remain hungry. This paradox arises from the fact that wheat, like all the grain crops, usually requires fairly extensive processing before it is acceptable as food for the human being. The results of such processing, and their correction through enrichment and related means, are a significant element in the nutritional welfare. For the grain foods today remain, despite a gradual decline in their consumption during the 20th century, the largest single major food group in this country. In the United States, 6 grains are consumed by human beings in sizable amounts. They are, approximately in the order of their preponderance, wheat, corn, rice, oats, rye, and barley. Wheat is by a large margin the major American cereal and wheat and corn together constitute some 90 per cent of total human grain consumption.[1]

Preparation of the grains for food use may be segregated into 4 basic procedures: (1) milling, (2) manufacture, (3) restoration of nutrients to original levels, and (4) supplementation with nutrients to augmented levels.

## MILLING

The first of the 4 basic procedures, *milling*, is applied to practically all of the grains consumed in this country. For example, census reports on the flour industry reveal that less than 2 per cent of the wheat flour manufactured is the whole grain product, the remainder being milled white flour.[2] Milling, as is well known, comprises removal of the outer chaffy husk or hull from the grain kernel, followed by separation of the bran coats and the germ or embryo. The endosperm remains; this may be left whole as in the instance of rice, may be broken into coarse particles like corn grits, or may be ground fine to make meals and flours.

Various "undermilling" processes exist that are designed to retain part of the bran and germ in the portion of the grain used for food. In addition, methods are available for transfer of nutrients from the outer layers of the grain kernel to the endosperm, prior to milling.[3-5] At present such procedures have limited use.

## MANUFACTURE

After milling, some cereal foods, like rice, are prepared for consumption by merely boiling. Preparation of other grain foods, namely bread and related baked products, macaroni and noodle products, and ready-to-eat breakfast cereals, involves the second phase of processing, which we have designated as *manufacture*. Manufacture frequently enhances nutritive value because of nutritious ingredients, such as milk or eggs, customarily added to certain products at this time. The only nutrient loss of moment during manufacture is a reduction in thiamine resulting from the heat

* Presented before the Food and Nutrition Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 9, 1948.

of baking bread and similar foods, and from other heat treatment, such as toasting, applied in the making of prepared breakfast cereals.[6] This reduction is readily corrected. For example, in the making of enriched bread a surplus of thiamine of approximately 20 per cent is added to the dough, to offset heat losses during baking. In the making of prepared breakfast cereals, a fortifying mixture is frequently sprayed upon the product after toasting, while the product is still hot enough to dissipate the moisture of the spray, but not hot enough to affect thiamine. Grain food processors have little concern with the protection from destruction by light of factors like riboflavin. Furthermore, oxidation-labile factors like ascorbic acid do not occur in significant amounts in the grains, so that these industries have no problem with prevention of oxidative nutrient losses. It is of interest to note that a fortuitous increase in iron content frequently occurs, during both milling and manufacture, as a result of the use of iron and steel equipment.

### RESTORATION OF NUTRIENTS

We have seen that consumers in general demand grain foods in the milled form, and also that major grain foods in addition undergo the processing involved in manufacture. Since milling removes the nutrient-rich bran and germ, it produces a significant change in nutritive value; and manufacture, as has been shown, may cause an additional loss of thiamine. The practical solution to the problem of these losses has proved to be *restoration of nutrients*, which has been designated as the third of the 4 basic operations in cereal processing. Restoration is practical because synthetic vitamins, and wholesome assimilable mineral salts, are inexpensive and available in plentiful supply, and because such vitamins and minerals may be added to grain foods without altering flavor or appearance.

The nutrients selected for addition to grain foods, and the levels used, are based on various standards and recommendations. The U. S. Food and Drug Administration has promulgated definitions and standards of identity for enriched flours and farina,[7] enriched macaroni products and enriched noodle products,[8] and enriched corn grits and enriched corn meals.[9] A similar definition and standard of identity for enriched breads and rolls was proposed in 1943,[10] and has been the basis of a practical program since then. For breakfast cereals, the Food and Nutrition Board of the National Research Council has recommended nutrients and levels for fortification.[3] No standards or recommendations are available for fortification of rice, but such fortification is now practised to a limited extent on a voluntary basis, using the nutrients and levels of the official enriched flour standard, with riboflavin omitted because its yellow color would be foreign to the product.[11]

Flours and meals are enriched by use of a powdered vitamin-mineral premix having the same fine particle size as the product. This premix is blended with the flour at the mill by means of continuous automatic machinery, in a proportion of ½ to 1 ounce per 100 lb. of flour. Enrichment of grain foods of large particle size, such as corn grits or rice, at first presented serious difficulty. A powdered premix added to such products would not remain uniformly distributed, and furthermore would be leached out by the water used for the washing and cooking these foods undergo before consumption. The clever expedient developed to overcome these difficulties is the use of actual corn grits or rice kernels that are impregnated with the enrichment nutrients in a high concentration, and then coated with an edible, water-resistant film. This film helps protect the nutrients against losses in washing and cooking. The "super-enriched"

particles do not differ significantly in appearance from the rest of the product. The concentrations of added nutrients in the super-enriched particles are so designed that for corn grits they are mixed into the product in a ratio of 1 lb. to 800 lb., for rice in a ratio of 1 lb. to 200 lb. These proportions assure that servings of the foods as normally eaten contain the proper concentration of enrichment nutrients.

Enriched bread may be made by using enriched flour, but commercially produced bread is frequently enriched by means of enrichment wafers. Considerable research was necessary to design such enrichment supplements, in order to provide the desired nutrient levels, but still avoid exceeding the maximum limits that are imposed by the standards. The possibility of exceeding maximum limits arises from the fact that the regular bread ingredients are significant sources of the enrichment nutrients. Thus the yeast used to leaven bread provides roughly 3 per cent of the thiamine, 13 per cent of the riboflavin, and 4 per cent of the niacin in enriched bread. White flour contributes 15 per cent of the thiamine, 9 per cent of the riboflavin, 25 per cent of the niacin, and over 40 per cent of the iron. When dry nonfat milk solids are included in the bread formula in the frequently used proportion of 3 lb. to 100 lb. of flour, they supply 19 per cent of the riboflavin in enriched bread.

Macaroni and noodle products made in continuous presses are enriched by a procedure similar to the one described for flour; when made by means of batch operations they are enriched by use of wafers similar to bread enrichment tablets. A fortified dry yeast preparation is also supplied to this industry for enriching purposes.

### SUPPLEMENTATION WITH NUTRIENTS

Enrichment levels for riboflavin, as we shall see in a moment, transcend the restoration principle in that they go considerably higher than the levels found in natural whole grains. Therefore, the discussion just concluded of *restoration of nutrients* has impinged upon our fourth and final fundamental operation in the processing of grain foods, *supplementation with nutrients*. Calcium is included as an optional ingredient in the enrichment standards, also at levels ranging considerably higher than those found in the original grain. Vitamin D is the second optional enrichment ingredient, and since this vitamin does not occur in the grains in significant amounts, its use is tantamount to supplementation rather than restoration.

The nonfat dry milk solids frequently used in commercial breads have been shown to contribute riboflavin; this ingredient also enhances protein value and adds calcium. Other nutritive supplements permitted by federal standards of identity for grain foods include various milk products, eggs, wheat germ, soya products, and inactive dry yeast. Recently published reports show the nutritive advantages gained by such supplementation.[12-14]

### CUMULATIVE EFFECTS

Having reviewed the fundamentals of the effects of the various phases of cereal food processing upon nutritive values, let us consider these effects in quantitative terms, choosing for illustration the leading grain food, bread. Table 1 shows values for thiamine, riboflavin, niacin, and iron in whole

TABLE 1

*Nutrient Values of Various Breads*
*Milligrams per Pound*

| | *Whole Wheat Bread* | *Unenriched White Bread* | *Enriched White Bread* |
|---|---|---|---|
| Thiamine | 1.3 | 0.3 | 1.5 |
| Riboflavin | 0.7 | 0.3 | 1.2 |
| Niacin | 15.9 | 3.6 | 12.5 |
| Iron | 11.3 | 3.6 | 10.3 |
| Calcium | 276 | 236 * | 550 |

* 300 mg. per lb. when made with 3 lb. nonfat milk solids per 100 lb. flour.

wheat bread, unenriched white bread and enriched white bread. Calcium is shown for whole wheat and unenriched white breads, for bread enriched to the level provided as optional in the proposed standard, and for bread not enriched with calcium but containing the frequently used 3 lb. of nonfat dry milk solids per 100 lb. of flour.[15] Values for whole wheat and white breads are variable; those shown were chosen arbitrarily from one of the standard reference manuals.[16] Values for enriched products also may vary within the limits imposed by the standards; shown here are median values.

All 5 nutrients are, of course, lower in the white bread than in the whole wheat bread, as a result of the milling of the flour. Enrichment, however, accomplishes restoration to approximately whole grain levels for thiamine, niacin, and iron. For riboflavin, in contrast, enrichment produces a level considerably higher than that in the original grain. This high level results from the rationale followed in establishment of the enrichment standards, which leaned as much toward correction of recognized dietary deficiencies as toward restoration of whole grain levels. This policy has been set forth at length by the Food and Drug Administration.[17]

Calcium, like riboflavin, rises well above whole grain levels if enriched to median values. When not added by enrichment, but provided by a commonly used percentage of milk solids, calcium returns to approximately whole grain levels. Baked foods made with enriched self-rising flour also supply high levels of calcium, as this nutrient is required rather than optional in enriched self-rising flour, and the maximum calcium level set by this standard is over twice as high as the maximum set for regular enriched flour.[7]

## PRESENT EXTENT OF ENRICHMENT

During the late World War emergency, enrichment of all bakers' white breads and rolls was required by War Food Order No. 1 of the War Food Administration. This order is of course no longer in effect during current non-emergency times. The only laws at present requiring enrichment are those enacted by various states. At this writing approximately half of the states have in effect laws requiring enrichment, and presumably others will consider such legislation. All of the state enrichment laws include wheaten foods, and a number of the southern states, where much corn is consumed, extend the enrichment requirement to corn products. Enrichment was widespread on a voluntary basis before any mandatory enrichment laws existed, and at present, data on the sale of enrichment preparations in states not having such laws indicate that voluntary enrichment is still carried out on a large scale.

## SUMMARY

In general, consumers demand grain foods in milled and manufactured form. These processing operations reduce certain nutrients present in the original grains. Since cereals are a major American food, this nutrient loss originally constituted a serious nutritional problem. The practical answer to this problem has proved to be enrichment, restoration, or fortification, mainly by the use of synthetic vitamins and assimilable mineral salts. The rationale followed in establishing enrichment levels has led on occasion to concentrations of nutrients higher than those in the natural whole grain. This fact, plus the customary use of supplementary nutritive ingredients in the making of certain grain foods, means that in some respects the milled and manufactured products may be more nutritious than the grains from which they are made.

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# Courses in the Diagnosis and Treatment of Poliomyelitis

The National Foundation for Infantile Paralysis, Inc. announces short courses in the diagnosis and treatment of poliomyelitis patients for physicians as follows:

| *Training Center* | *Scheduled Courses* | *For Detailed Information and for enrollment write to:* |
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| University of Colorado Medical Center<br>Denver, Colo. | May 23–28<br>Nov. 14–19 | Winona C. Campbell, M.D.<br>Director of Poliomyelitis Teaching Program |

# Nutrient Retention During Canned Food Production*

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IT is well established that the nutritive values of foods at the time of consumption may be conditioned by operations involved in home preparation or in commercial food processing. Kitchen procedures such as boiling, baking, broiling, or roasting employed to render raw foods edible or acceptable reduce the amounts of certain nutrients initially present in the raw materials.[1-5] Likewise, operations in commercial milling, dehydration, freezing, canning, or other food preserving industries may also affect the nutrient composition of raw foods. The mechanisms causing these changes have been described elsewhere.[6]

In the current National Canners Association-Can Manufacturers Institute Nutrition Program[7-9] controlled studies under commercial conditions were made to develop more complete information on the effect of canning operations on nutrient retention in raw foods. These investigations were designed to avoid the criticisms[6] which can be applied to similar investigations in the past in which results on small scale laboratory packs have been extrapolated to commercial practices. Two general types of retention studies were made; the so-called "overall" vitamin retentions of the complete canning procedure, and specific retentions during particular operations within canning procedures.

* Presented before the Food and Nutrition Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 9, 1948.

## ESTIMATION OF VITAMIN RETENTION

In work on vitamin retention during canning, several methods for expressing the results obtained may be used. The most common method is to compare the vitamin content of the raw material and the finished canned product per unit weight, calculated on the dry basis. This method is not free from criticism but it is the most convenient yet suggested. From the standpoint of practical nutrition the errors involved are of questionable significance. Likewise, expression of vitamin retention in terms of percentages, rather than by comparison of the initial and final vitamin content simplifies handling of the data. Consequently, these two conventions have been followed in the following discussions.

## OVERALL VITAMIN RETENTIONS

The so-called "overall" vitamin retention reflects the degree of vitamin conservation attained during the sequence of operations required to convert the raw material into the finished canned product. In this presentation, only vitamin retention data were considered which had been obtained during actual commercial canning operations in studies sponsored by the NCA-CMI program[10-12] or in related work undertaken in the authors' laboratories, both published[13,14] and unpublished.

Tables 1 through 3 present the overall ascorbic acid, carotene, niacin, ribo-

flavin, and thiamine retentions observed in a number of products during actual commercial canning operations. The products chosen for this illustration are subjected during canning to diverse operations which influence vitamin retention such as peeling, cutting, extraction, comminution, and so forth.[15] The overall vitamin retentions observed in the commercial canning of these representative foods should therefore reflect the general situation with respect to conservation of essential nutrients in canned foods as a class. For the purposes of this exposition, no distinction was made in certain instances for style of pack or variety. The data shown for asparagus may include both white and green asparagus packed as whole spears or cuts; Alaska and sweet peas have been considered together, and the available data observed for all varieties of green beans packed as whole beans or cut beans have been grouped. As indicated in the tables, the amount of available data varied from 4 observations made on the overall retention of carotene in yellow corn to 93 on the retention of ascorbic acid in grapefruit juice. Where 30 or more observations were available, frequency distributions were calculated and the maximum and minimum retentions shown represent the figures within which 90 per cent of the observations were found to fall. By this procedure, observations which were unusually high or favorable, or which were so low as to indicate atypical conditions, were eliminated from consideration.

With respect to overall ascorbic acid retention, the data (Table 1) indicate that the canning procedures used for asparagus and the citrus juices effect very high retentions of this nutrient; for the latter products, the minimum to maximum variations or ranges of retention are small and the mean retentions are more than 90 per cent. The range of retention of this vitamin in tomato juice is more variable and this is also true of the products subjected to relatively severe blanching procedures, namely, green beans, Lima beans and peas. In all the products shown, however, the mean percentages of ascorbic acid retention may still be considered substantial, especially if translated into the percentages of the daily adult requirement for ascorbic acid supplied by a usual or convenient serving of the foods. The data on carotene retentions, also shown in Table 1, substantiate the known fact that commercial canning procedures have only slight effects on this factor. The mean carotene retentions for the products listed range from 67 to 97 per cent.

The data on niacin retentions (Table 2) suggest that, for most of the

TABLE 1

*Overall Ascorbic Acid and Carotene Retentions in Canned Foods*

| | *Ascorbic Acid* | | | | *Carotene* | | | |
|---|---|---|---|---|---|---|---|---|
| | | *Per cent Retentions* | | | | *Per cent Retentions* | | |
| *Product* | *Number Observations* | *Max.* | *Min.* | *Mean* | *Number Observations* | *Max.* | *Min.* | *Mean* |
| Apricots | 10 | 97 | 76 | 87 | 10 | 98 | 77 | 89 |
| Asparagus | 32 | 100 | 80 | 92 | .. | .. | .. | .. |
| Carrots | .. | .. | .. | .. | 7 | 100 | 83 | 97 |
| Corn, Yellow, W.G. | .. | .. | .. | .. | 4 | 100 | 87 | 97 |
| Grapefruit Juice | 93 | 100 | 90 | 96 | .. | .. | .. | .. |
| Green Beans | 41 | 75 | 40 | 55 | 9 | 96 | 81 | 87 |
| Lima Beans | 10 | 100 | 60 | 76 | .. | .. | .. | .. |
| Orange Juice | 15 | 100 | 94 | 98 | .. | .. | .. | .. |
| Peaches | 21 | 91 | 59 | 71 | 7 | 100 | 59 | 83 |
| Peas | 43 | 90 | 45 | 72 | 12 | 100 | 88 | 97 |
| Tomatoes | .. | .. | .. | .. | 6 | 89 | 45 | 80 |
| Tomato Juice | 90 | 90 | 35 | 67 | 7 | 74 | 60 | 67 |

TABLE 2

*Overall Retentions of Niacin and Riboflavin in Canned Foods*

| | *Niacin Retentions* | | | | *Riboflavin Retentions* | | | |
|---|---|---|---|---|---|---|---|---|
| | | *Per cent Retentions* | | | | *Per cent Retentions* | | |
| *Product* | *Number Observations* | *Max.* | *Min.* | *Mean* | *Number Observations* | *Max.* | *Min.* | *Mean* |
| Asparagus | 22 | 100 | 77 | 96 | 26 | 100 | 65 | 88 |
| Corn, Yellow, W.G. | 13 | 96 | 72 | 86 | 13 | 100 | 68 | 97 |
| Green Beans | 30 | 100 | 80 | 92 | 30 | 100 | 85 | 96 |
| Lima Beans | 11 | 100 | 77 | 85 | 12 | 100 | 50 | 87 |
| Peaches | 3 | 92 | 87 | 89 | .. | .. | .. | .. |
| Peas | 32 | 80 | 50 | 65 | 43 | 100 | 70 | 82 |
| Tomatoes | 6 | 100 | 92 | 98 | 6 | 100 | 100 | 100 |
| Tomato Juice | 17 | 100 | 83 | 98 | 17 | 100 | 86 | 97 |

TABLE 3

*Overall Retentions of Thiamine in Canned Foods*

| | | *Per cent Retentions* | | |
|---|---|---|---|---|
| *Product* | *Number Observations* | *Max.* | *Min.* | *Mean* |
| Asparagus | 31 | 85 | 60 | 67 |
| Corn, Yellow, W.G. | 14 | 48 | 20 | 34 |
| Green Beans | 41 | 90 | 55 | 71 |
| Lima Beans | 15 | 67 | 32 | 47 |
| Peaches | 8 | 93 | 64 | 76 |
| Peas | 54 | 70 | 40 | 54 |
| Tomatoes | 6 | 100 | 89 | 96 |
| Tomato Juice | 18 | 100 | 73 | 89 |

products listed, the canning procedures involved have small effect on this nutrient. The lowest mean niacin retention was 65 per cent in the case of peas. For the remaining products, mean niacin retentions of 85 to 98 per cent were observed. Riboflavin retentions (Table 2) during canning are to be considered excellent from the standpoint of the ranges of retention and the indicated mean retentions which ranged from 82 to 100 per cent.

Great variability in overall retention is to be noted in the case of thiamine (Table 3). This factor is heat-labile and is also known to be extracted from foods during blanching operations. Acid products such as peaches, tomatoes, and tomato juice, which do not require blanching during preparation and which are customarily processed at 212° F., show high mean retentions of thiamine (76 to 96 per cent). The low-acid products (asparagus, corn, green beans, Lima beans, and peas) subjected to blanching, to relatively severe heat processes, or to both, show more variable ranges of retention and, in general, lower mean retentions (34 to 71 per cent). None of the products considered, however, can be regarded as an outstanding source of this nutrient even in the raw state, when compared with certain foods of animal origin.

### RETENTIONS DURING BLANCHING

In addition to studies on overall nutrient retentions, surveys have been made of specific canning operations to determine which steps during the preparation and processing of canned food products are of most serious concern. Such step by step studies have revealed that blanching required in the canning of certain products is one of the operations where sacrifice of vitamin content may occur. Consequently, considerable effort has been devoted to investigation of this operation.

Experience has indicated that the blanching of raw vegetables in hot or boiling water or in live steam has distinct advantages. Blanching is used to obtain the desired appearance and

flavor in the final product, to effect proper fill of container and to reduce internal can pressure during heat sterilization by the elimination of air and other gases from the product and the container. There are other functions of the blanch, such as destruction of enzymes, but these are not commonly regarded as the primary objectives of the operation.

Any review of blanching schedules followed throughout the industry for the same product will show that the practices employed vary widely with respect to the time and temperature of blanching. Some canners have fixed blanching schedules to meet certain operational requirements. For the most part, however, blanching schedules have been set so as to attain desired or mandatory quality levels in the final product.

In most commercial canning operations, hot water blanching is employed in the preparation of certain vegetables for canning. This operation establishes conditions favorable to an extraction process whereby water-soluble nutrients, including the vitamins ascorbic acid, thiamine, riboflavin, and niacin, may be dissolved. The extent of such leaching depends upon the nature and maturity of the product, the amount of raw flesh of the vegetable exposed through cutting and bruising, and the time and temperature of the blanch. Where steam blanching is used, extraction of the water-soluble nutrients is not as great as may occur in hot water blanchers.

Information obtained in the NCA-CMI program surveys of specific operations of vegetable canning procedures,[10-12] together with information obtained in the laboratories of the authors, published [13] and unpublished, has been summarized and condensed to show the retentions of the above nutrients in blanched vegetables. The results of all of the commercial blanches studied are presented in Tables 4 and 5. The same conventions with respect to handling the data used in the case of overall retentions have been followed.

Ascorbic acid retentions during blanching (Table 4) reveal the best retentions for asparagus (mean—95 per cent), while the lowest and most variable retentions are to be observed for spinach (mean—67 per cent). To ex-

TABLE 4

*Ascorbic Acid and Niacin Retentions During Blanching*

| | *Ascorbic Acid Retentions* | | | | *Niacin Retentions* | | | |
|---|---|---|---|---|---|---|---|---|
| | | *Per cent Retentions* | | | | *Per cent Retentions* | | |
| *Product* | *Number Observations* | *Max.* | *Min.* | *Mean* | *Number Observations* | *Max.* | *Min.* | *Mean* |
| Asparagus | 26 | 100 | 74 | 93 | 8 | 100 | 77 | 94 |
| Green Beans | 38 | 90 | 50 | 74 | 29 | 100 | 60 | 93 |
| Lima Beans | 12 | 83 | 54 | 72 | 8 | 98 | 68 | 81 |
| Peas | 60 | 90 | 60 | 76 | 39 | 96 | 59 | 73 |
| Spinach | 41 | 99 | 6 | 67 | 34 | 100 | 63 | 83 |

TABLE 5

*Riboflavin and Thiamine Retentions During Blanching*

| | *Riboflavin Retentions* | | | | *Thiamine Retentions* | | | |
|---|---|---|---|---|---|---|---|---|
| | | *Per cent Retentions* | | | | *Per cent Retentions* | | |
| *Product* | *Number Observations* | *Max.* | *Min.* | *Mean* | *Number Observations* | *Max.* | *Min.* | *Mean* |
| Asparagus | 12 | 100 | 72 | 90 | 12 | 100 | 79 | 92 |
| Green Beans | 29 | 100 | 70 | 95 | 34 | 100 | 82 | 91 |
| Lima Beans | 8 | 100 | 59 | 76 | 12 | 77 | 36 | 58 |
| Peas | 37 | 87 | 67 | 75 | 60 | 100 | 73 | 88 |
| Spinach | 37 | 100 | 78 | 88 | 85 | 100 | 67 | 85 |

plain these variations, one has to know only that the comparatively small surface area of the asparagus, combined with the relatively short blanching time for the product, would tend to minimize destructive effects. In contrast, spinach is a product with a thin, extensive surface area due to its leaf-like character. Also, considerably more severe blanching conditions were imposed upon this product than was the case with asparagus, thus producing more favorable conditions for solution of water-soluble material. The retention of niacin during blanching (Table 4) suggests that niacin is more firmly bound in the products studied than ascorbic acid, since the retention generally seems to be of a higher order. It also appears that this vitamin is not as water-soluble as other members of the vitamin B-complex. Mean retentions of this nutrient for most of the products were in excess of 80 per cent. Riboflavin retentions during blanching (Table 5) are rather good in most vegetables with the exception of Lima beans where the range is rather wide. Lima beans and peas showed mean retentions of about 75 per cent; riboflavin retentions in the other products listed were in excess of 80 per cent.

The retention of thiamine during blanching is also portrayed in Table 5. One interesting item in this table is the low mean retention of thiamine in Lima beans, namely, 58 per cent, with a range of retention for this specific operation of 36 to 77 per cent. While niacin and riboflavin retentions for all five vegetables listed were generally of the same order, the retention of thiamine in Lima beans dropped to a mean of 58 per cent as compared to mean retentions of 76 and 81 per cent for riboflavin and niacin, respectively. While the data presented may be influenced by the number of observations involved, this finding might deserve further investigation.

### RETENTIONS DURING THERMAL PROCESSING

The heat-labile properties of thiamine raise the question as to retention of this vitamin during heat sterilization of canned foods. Other nutrients seem little affected by this operation. The effect of the pH of the product being processed is of importance, although there is a difference of opinion as to the specific importance of this variable upon thiamine retention during heat sterilization. It has been postulated that there are materials in some products which stabilize thiamine toward heat and that these materials may be of considerable importance in effecting maximum retention of this particular nutrient. In general, products such as tomatoes and tomato juice which are sterilized at relatively low temperatures because of their low pH, have a high degree of retention of thiamine while low retentions are found in products such as whole kernel corn. These low retentions may be explained by the relatively severe heat process necessary for sterilization. Typical thiamine retentions in vegetables during commercial thermal processing are the data reported by Clifcorn and Heberlein[13] shown in Table 6. The effect of thermal processing upon the thiamine content of canned foods is conditioned to a large extent by the time and temperature relationship of the sterilization operation. This relationship is, in turn, affected by different can sizes and the nature of the product, with particular reference to whether heat transfer occurs by convection or by conductance during the thermal processing operation.

### IMPROVED VITAMIN RETENTIONS

Since blanching is a major factor conditioning vitamin retention in certain canning operations, it has been the point of emphasis as far as present and future studies are concerned. Experiments are now under way on new types of experi-

TABLE 6

*Thiamine Retentions During Thermal Processing*

(After Clifcorn & Heberlein)

| *Product* | *Process* | | *Can Size* | *Retentions During Sterilization Process (Per cent)* |
|---|---|---|---|---|
| | *Min.* | *° F.* | | |
| **Asparagus** | | | | |
| Whole spears | 14 | 248 | 300 | 66 |
| Center cuts | 14 | 248 | 300 | 63 |
| Fancy cut | 14 | 248 | 300 | 64 |
| **Corn, whole kernel** | | | | |
| White | 30 | 250 | 2 | 31 |
| Yellow | 30 | 250 | 2 | 47 |
| **Green beans** | | | | |
| Whole, No. 3 sieve size | 20 | 240 | 2 | 79 |
| Cut, No. 4 sieve size | 20 | 240 | 2 | 73 |
| **Lima beans** | | | | |
| Standard | 30 | 240 | 2 | 71 |
| Extra standard | 30 | 240 | 2 | 58 |
| **Peas, sweet** | | | | |
| Unsieved, fancy | 35 | 240 | 2 | 67 |
| Unsieved, fancy | 45 | 245 | 2 | 60 |
| Unsieved, standard | 35 | 240 | 2 | 67 |
| Unsieved, standard | 45 | 245 | 2 | 67 |
| **Peas, Alaska** | | | | |
| Sieve 1, fancy | 35 | 240 | 2 | 64 |
| Sieve 1, extra standard | 35 | 240 | 2 | 63 |
| Sieve 2, extra standard | 35 | 240 | 2 | 61 |
| Sieve 2, extra standard | 35 | 240 | 2 | 64 |
| Sieve 3, fancy | 35 | 240 | 2 | 59 |
| Sieve 3, standard | 35 | 240 | 2 | 67 |
| Sieve 4 | 35 | 240 | 2 | 64 |
| Sieve 5 | 35 | 240 | 2 | 69 |
| **Tomatoes** | 35 | 212 | 2 | 89 |
| **Tomato Juice** | 20 | 212 | 2 | 74 |

mental blanchers embodying principles which might be more generally applied in commercial blanching in the future. With respect to existing equipment, studies on the effect of the time and temperature relationships in hot water blanching have revealed that the high-temperature short-time blanches are generally superior from the standpoint of maximum vitamin retention. In all instances this type of blanch yielded the same quality of product as obtained by low-temperature long-time blanches. With the green beans, the short-time high-temperature blanch was definitely superior from the quality standpoint. More detailed attention to the time and temperature relationships in hot water blanching, more extensive use of steam blanching, and possibly equipment improvement should reduce significantly the sacrifices of water-soluble nutrients during this particular step in the preparation of the products for canning.

New principles such as non-aqueous or steam pressure blanching also have been studied which would require radical changes in existing equipment. Preliminary work by Ives[16] has shown that very favorable ascorbic acid retentions result from application of these two new principles but their effect on final product quality may be questionable, or at best is still to be established. Consequently, the indicated approach to improved nutrient retention during blanching by modified use of existing equipment is to be considered the most practical at this time.

With respect to improved retention of heat-labile factors such as thiamine, the tendency of the canning industry is to

employ more high-temperature short-time processes. The value of such processes in thiamine retention have been shown by Greenwood, *et al.*[17] This work has also shown the effect of increased can size on vitamin retention in the same conduction heating product; namely, as can size increased, the degree of vitamin retention decreased due to the relatively more severe heat processes necessary for the larger sizes of container. Likewise, these investigators studied the relationship existing between vitamin retention at the periphery of the container and retention of the same vitamin in the center. It was found that a gradient of vitamin retention exists in conduction heating products, with higher retentions being observed at the center of the container. This is due to the fact that during long heat processes the product adjacent to the walls of the container receives a more severe heat treatment than that at the center of the can.

Greenwood, *et al.* also related the sterilizing value of the process ($F_0$) with respect to thiamine retention. It was found that with each 18° F. rise in temperature, the rate of thiamine destruction is approximately doubled while the rate of bacterial destruction is increased approximately tenfold. These data suggest that increased thiamine retention will result from application of high-temperature short-time thermal processing schedules wherever possible. The work of Greenwood, *et al.* has been confirmed by later studies, in which thiamine retentions in cream style corn and vegetable puree sterilized by high-short and conventional processing methods have been compared.[14]

New methods for agitation of foods during processing also have shown improved thiamine retention over conventional processing techniques.[18] Agitation during processing increases the rate of heat penetration into the container so that application of the necessary effective heat is attained in shorter time with increased retention of thiamine. Extended use of the high-short and agitating types of process should result in even greater retentions of heat-labile nutrients than is now accomplished commercially.

## SUMMARY

Operations commonly involved in the home preparation or in the commercial processing or preservation of food may affect the initial nutrient compositions. Such operations are necessary to render food edible or attractive, attain required or desired levels of food quality, or insure the success of commercial food processing or preserving procedures.

A considerable volume of literature has been developed on nutrient retention during commercial canning, and the data obtained in major studies in this field are summarized and discussed. Vitamin retentions vary with the product and nutrient under consideration. However, raw products significantly high in specific nutrients remain significant sources after canning. Certain operations, notably blanching, are subject to improvement, and studies of this type currently in progress are described. The newer types of high-short thermal processing show considerable promise of improved retention of heat-labile vitamins in products to which such processes may be applied.

ACKNOWLEDGMENT—The authors gratefully acknowledge the considerable assistance received from Mr. D. G. Heberlein, Drs. Margaret Ives and J. F. Feaster, and Miss Edwyna Preiss in preparation of the manuscript.

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# Massachusetts Public Health Conference

The three day Massachusetts Public Health Conference promises a varied menu of well balanced professional nourishment. It will be held at the University of Massachusetts at Amherst, June 15, 16, and 17.

The opening session on Wednesday morning will be concerned with new horizons for public health personnel. In the evening, the Honorable Oscar R. Ewing and Dr. Morris Fishbein will discuss the National Health Program.

Thursday will be given over to a wide variety of subjects and will end with the annual banquet at which will be heard a widely known speaker—his name is a dark secret.

Friday morning promises to be the high spot of the conference. Experts in mental health, heart disease, diabetes, and other special programs will outline modern concepts and relate them to the general administrative program. Dr. C.-E. A. Winslow, as the luncheon speaker, will bring the session to an inspiring close.

# The Possible Significance of Milk and Water in the Spread of Virus Infections*†

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SINCE milk and water have been incriminated in the spread of many bacterial diseases, such as dysentery, typhoid fever, undulant fever, tuberculosis, diphtheria, scarlet fever, septic sore throat, and tularemia, to name a few, one might assume that certain of the virus infections of man might be disseminated through these same channels. If one classifies virus diseases roughly into two groups, those whose routes of transmission are definitely known and those whose transmission is either unknown or suspected but not proved, we find that milk or water is involved in the dissemination of only one and possibly two of the agents whose mode of spread is known. This leaves a relatively small number of the second group of diseases.

Three of these diseases, herpes simplex, encephalomyocarditis, and infectious mononucleosis, to the best of my knowledge, have not been studied from the point of view of milk and water; probably because the latter has not been definitely shown to be due to a virus and because some form of contact seems most likely for the others.

Another infection of probable virus etiology, pretibial fever, recently described by Bowdoin[1] and by Daniels and Grennan,[2] has the interesting epidemiological characteristic that most of the cases in the two reported outbreaks had been swimming in or living near common water sources. No insect vector could be incriminated and further studies have not revealed the mode of spread, although Tatlock[3] was successful in passing the agent by inoculating fresh whole blood of infected individuals into young guinea pigs, hamsters, and embryonated eggs.

Thus, we are left with a consideration of 6 diseases, namely, inclusion blenorrhea or inclusion conjunctivitis, infectious hepatitis, foot-and-mouth disease, epidemic diarrhea of the new-born, Q fever, and poliomyelitis. These virus diseases of human beings are the only recognized ones with which milk or water or both have any possible relationship.

The first of these, inclusion conjunctivitis, is usually seen clinically as a disease of infants. The reservoir of the virus is a mild genitourinary disease of adults which is probably transmitted venereally and in which low grade nongonococcic urethritis is the lesion in the male and subclinical cervicitis in the female. The most common means of transfer to the eye is birth canal infection of infants during delivery. However, definite examples of inclusion conjunctivitis have apparently been contracted

* Presented before a Joint Session of the Food and Nutrition and Laboratory Sections of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 9, 1948.

† Aided by a grant from the National Foundation for Infantile Paralysis, Inc.

from swimming pools, the incubation period in each case being exactly 7 days. Genitourinary discharges into the water are the probable sources of contamination. There seems to be little doubt that chlorination and other methods of disinfecting pools have cut down the incidence but are not entirely prophylactic. Experimental studies have shown that the virus can survive in untreated water for as long as 6 hours.[4] It is thought that even in the presence of chlorine, water would be dangerous if freshly contaminated by discharges from an infected individual.

Infectious hepatitis is a disease which has commanded more and more attention during recent years and which was a significant factor among our troops during the recent war. Neefe and Stokes[5] have described an outbreak of this disease in a summer camp which was apparently water-borne. Three hundred and fifty of 572 individuals in the camp became infected within a period of 7 weeks, 255 of these resulting in overt jaundice. This epidemic was characterized by an unusually high incidence, the simultaneous infection of a number of persons at the camp not in personal contact with each other, and by the apparent ease with which the agent was acquired at camp in contrast to the few cases among those in contact with infected persons developing the disease away from camp after returning home. Epidemiological evidence clearly ruled out air, fomites, biting insects, food, milk, lake water, and personal contact in the transmission of the agent during this outbreak. Well water which was exposed to the discharges of the original case through cess pools seemed to be the reservoir of infection. By means of human volunteers the agent, which passed Seitz filters, was found to be present in the blood and feces of cases but not in nasopharyngeal washings, urine, or flies. Serum produced the disease in volunteers only when administered orally, not parenterally. Water from the well which was used by all the cases produced a mild illness associated with hepatic dysfunction, in 4 of 5 volunteers who subsequently were immune to the feces agent from other cases. Since bacteriological studies showed evidence of fecal contamination in this water and transmission experiments proved it contained an agent, this appears to be the first evidence of natural transmission to man of any virus agent by water.

Our laboratory observed an outbreak in a rural school group which resulted in jaundice of 41 of 74 pupils during a period of four months.[6] The source of infection was apparently water.

Gauld[7] in describing field studies of infectious hepatitis among troops in the Mediterranean Theater of operations was impressed with the fact that it seemed to be a disease of fall and winter, and he thought the epidemiological pattern was strongly suggestive of respiratory spread rather than by gastrointestinal or insect routes. However, he described one explosive outbreak in a mountain infantry regiment which was believed to have resulted from drinking contaminated well water.

Neefe, Stokes, Baty, and Reinhold,[8] using human volunteers who received feces infected water treated in various ways, found that the causative agent of infectious hepatitis was not inactivated or attenuated by a 40 minute period of contact with sufficient chlorine to provide a residual chlorine concentration of 1 p.p.m. after 30 min. of contact. Superchlorination (treating with sufficient chlorine to reach the "break-point" and provide a chlorine residual of 15 p.p.m. after 30 minutes' contact) resulted in a definite attenuation of the hepatitis agent. The agent was not completely removed or inactivated by treatment with sodium carbonate, aluminum sulfate or activated carbon. However the incidence of disease was lower, the in-

cubation periods longer, and the disease much less severe than in the control group suggesting a decrease in concentration of virus or a decrease in virulence, or both.

Further studies on disinfection of hepatitis contaminated water were reported by the Army Epidemiological Board.[9] Of 6 volunteers receiving untreated water, 5 developed hepatitis with the usual "short" incubation. Of 7 volunteers receiving the same water after filtration and coagulation, 3 developed the disease after a longer incubation period. None of 7 subjects given the same water after filtration, coagulation, and chlorination developed hepatitis. Thus, a 30 min. chlorine residual of 1 p.p.m. is probably sufficient to inactivate this agent *providing the water is properly treated prior to chlorination.*

That this disease may also be transmitted through contaminated milk supplies has been shown by Murphy, Petrie and Work[10] who incriminated this medium as the source of infection in a small outbreak of 10 cases in Georgia. All 10 cases drank raw milk from the same source and within the limits of the incubation period all developed frank jaundice. None of the non-consumers developed hepatitis although they were 20 times more numerous. Prior to the outbreak, 2 cases of the disease had occurred in a household adjoining that of the dairyman, and the 2 families had been in close, even intimate contact. The milk was handled in the open, 100 feet from a dilapidated surface toilet serving both families. Many flies were present. No evidence incriminating any other common source of infection for the 10 cases, either food or water, could be obtained. Although there was contact among some of these, the evidence did not support that means of dissemination. No virus studies were made.

Foot-and-mouth disease is a highly contagious infection of cattle, pigs, sheep, and goats, which, fortunately, is not a major problem in this country at the present time. While it is rarely transmitted to human beings, such transmission is effected by ingestion of virus contaminated food, handling the active agent (as in the laboratory), and by contact with infected animals. Since the virus is found in the blood, saliva, urine, feces, vesicular lesions, and milk of infected animals, such materials, as well as meat and dairy products, play an important rôle in the spread of infection. Boiling or pasteurizing of farm products should be adequate for control of this disease in the human population.

Epidemic diarrhea of the new-born is an acute, communicable disease of neonatal infants. The evidence that it is caused by a virus is fairly well established. Several laboratories[11-13] have isolated from stools of sick infants a filterable agent which is serially transmissible through young calves, and there is some evidence that the virus may be isolated on scarified rabbit corneas.[14-15] As far as is known the agent could be disseminated by any one of several ways, all of which reflect either respiratory or gastrointestinal contamination, which includes milk as a possibility. No sure method of controlling the disease is known except for avoiding upper respiratory infection and diarrhea among nurses and mothers and observing strict nursery technique which includes sterilization by autoclaving of the formulas.

The relationship of this disease to epidemic gastroenteritis recently described by Gordon, Ingraham, and Korns[16] is unknown. These authors reproduced the illness in series in human volunteers by oral administration of a filterable agent obtained from the stools and throat washings of adult institutionalized patients. The pattern of spread of the naturally occurring disease bore no apparent relationship to a common source distribution of milk, food, or water, and direct person to person contact was thought to be the mode of transmission.

Q fever, a rickettsial disease, is included in this review for several reasons. Rickettsiae are customarily classified with viruses rather than with bacteria on the basis of size, growth requirements, and other characteristics. The organisms causing Q fever, for example, are so small in some preparations that they are no larger than the elementary bodies of vaccinia and pass through Berkefeld N filters with ease. Furthermore, this rickettsial disease is in contrast with the spotted fever and the typhus fever groups, in that the transmission is not sharply defined as requiring an insect vector.

Epidemiological studies of Q fever have rather definitely implicated the cow with human infection. Derrick, Smith, and Brown [17] studying the disease in Australia found that 31 of 34 rural patients had close contact with cattle and 112 of 118 patients in the city of Brisbane had worked in meat works. Agglutinins for the organisms were found in the sera of some of the cattle. These workers, however, implicated ticks as playing some part at least in the transmission in that country.

The apparent lack of an insect vector in the American outbreaks and their explosive and isolated nature seems to be different from the picture in Australia. Shepard and Huebner [18] reported that 21 of 130 sera from cows in the Los Angeles area contained complement-fixing antibodies for the organisms. Although proximity to dairies by reason of residence or occupation was a common factor in more than 50 per cent of the 17 cases, none of them had intimate contact with cows suggesting some source of infection other than contact. Huebner and his coworkers [19] succeeded in recovering the rickettsia from the raw milk of 4 widely separated dairies. The organisms were not recovered from blood, urine, or feces of these cattle. The fact that nearly all the milk was transported before processing and much of it was sold raw suggested that infected milk might have served as the source of infection to man. Tests, as yet incomplete, indicate that the two methods of pasteurization in general use in large commercial milk plants have different effects on the organisms. The flash method, rendered the raw milk infected with rickettsia apparently non-infectious for guinea pigs, but the vat method, or 143° C. for 30 minutes, did not entirely inactivate all the organisms (unpublished data, Huebner, 1948).

Three apparently milk-borne epidemics of poliomyelitis have been described. Dingman [20] in 1916 reported 8 cases in 3 different boarding houses all of which used raw milk from the same source. Two children at the house of the dairyman had poliomyelitis prior to the onset of disease among these 8 whose onsets were all within a 2 day period. At one boarding house only those children who used the milk became ill, and among other families who used the same milk during this period, but who boiled it, no cases appeared.

Knapp, Godfrey, and Aycock [21] described an outbreak of 8 paralytic cases within an 11 day period among drinkers of the same raw milk supply. A boy employed at the dairy was milking cows and handling milk for a period of 4 days while in the acute stage of the disease. The 8 cases were further traced to one delivery of nights' milk while no cases occurred among those receiving mornings' milk from the same dealer. There was no record of direct contact between any of the cases and indirect in only 1.

Aycock [22] described a larger epidemic in Broadstairs, England, where the distribution of cases, in point of time, indicated simultaneous infection. Of a total of 75 cases, 69 could be associated with milk from one dealer. All the 43 paralytic cases used this milk. The milk was apparently pasteurized by the flash method only, in muggy weather, and was not bottled. No illness suggestive of

poliomyelitis had occurred in any of the dairy workers or anyone associated with the milk supply.

It is perhaps significant that the evidence incriminating milk in the above mentioned epidemics is based entirely upon epidemiological and clinical evidence. No virus studies were made on either the milk supplies or specimens from the cases.

Although some evidence is available to show that pasteurization temperatures are usually sufficient to inactivate poliomyelitis virus when suspended in water, the possible protective effect of milk on the virus, requiring higher temperatures for inactivation, has received scant attention. Lawson and Melnick [23] tested rodent adapted strains of virus and spontaneous mouse encephalomyelitis virus in both milk and water at different temperatures for 30 min. Their findings showed that a milk medium enables a 10 per cent suspension of the virus to withstand from 5 to 10° C. more heat for 30 min. than when the infected tissues were suspended in water and that milk seems to exert a protective action on destruction of virus by heat as may other proteins. The concentration of virus played a rôle in this phenomenon, the more dilute the virus suspension, the less heat being required to inactivate. However, with concentrated suspensions, occasional traces of virus could be detected after 30 min. at 65 and even 70° C. which is well above the usual temperature of pasteurization. However, there were no phosphatase controls and no evidence that thorough mixing had occurred. As previously mentioned, these experiments were performed with strains of murine poliomyelitis and information is still lacking on the susceptibility to heat of human strains of virus suspended in milk. A similar experiment performed by Ridenour but employing a setup more nearly approximating proper pasteurization technique and checked by means of the phosphatase test, showed that virus was readily inactivated under these conditions.[24]

The significance of water as a vehicle in the spread of this virus has been an enigma for years. Since Kling [25] reported the recovery of virus from well water used for drinking purposes by a case of the disease, this medium has been suspected but no one has duplicated his findings, with the possible exception of the report by Toomey, Takacs, and Weaver [26] who isolated an agent from creek water. In both these instances however, fecal contamination was not only possible but quite probable. In the latter case a drainage ditch containing sewage emptied into the creek near the source of water for these studies. Since the human intestinal tract represents the greatest single source of virus it is only natural that raw sewage has been found to contain it in large quantities. The repeated isolations of virus from sewage by Paul and Trask and others[27, 28] have not been a surprise, especially since the samples were usually taken near the outlet.

Since the virus of poliomyelitis is resistant to a wide variety of chemicals the efficacy of water treatment in removing this potential source of infection has been subject to much consideration, debate, and a certain amount of experimentation. Carlson, Ridenour, and McKhann [29] added virus to city water and to raw untreated water and simulated conditions of coagulation and sedimentation, sand filtration, absorption on activated charcoal, storage, and aeration. These procedures failed to remove the virus completely from such artificially, heavily contaminated water. The observers found that ultra-violet light from an artificial source has a greater effect on destruction of the virus than that exerted by direct sunlight and is more effective in inactivating or destroying virus suspended in water than any single purification method commonly utilized. The same authors [30] found

that activated sludge in amounts as low as 1,100 p.p.m. with 6 hours aeration will remove or inactivate virus as judged by infectivity tests in mice. Heavier concentrations of sludge with longer aeration periods largely eliminate the infectivity.

The effect of chlorine on poliomyelitis virus has been investigated by several workers. Kempf and Soule[31] found that a concentration of 0.55 p.p.m. did not inactivate the virus in 1.5 hr. but was effective after a 4 hr. period of contact. The residual chlorine was found to be 0.35 p.p.m. The same workers using calcium and sodium hypochlorite found that 1.0 p.p.m. for 25 min. had no effect on the virus.[32] After 4 hr. with a residual chlorine of 0.2 p.p.m. the material was still infectious. Their conclusions were that while virus can be inactivated by chlorine the amounts needed are greater than the normal residual concentrations carried in disinfection of drinking water and swimming pools and also that the time required to inactivate virus is beyond practical limits.

The above conclusions were based on the ether orthotolidine or the starch methods of determining residual chlorine which were standard at the time. These methods do not give true evaluations of the concentration of "free" uncombined chlorine or of any other solution containing ammonia or nitrogenous compounds. In the presence of such materials, chlorine compounds are formed which, although having higher oxidation potentials, have less disinfectant capacities.

By means of the orthotolidine-arsenite test it is possible to measure more accurately the concentration of "free" uncombined chlorine in the hypochlorous state in organically polluted solutions. Ridenour and Ingols[33] using this test found that a "free" chlorine residual of 0.2 p.p.m. will inactivate a 1:500 dilution of virus after 10 min. or 0.1 p.p.m. after 30 min. These amounts of "free" chlorine are well within the range of practical doses used in water treatment and in swimming pool sanitation. The effectiveness of "free" chlorine residuals is independent of the type of chlorine-bearing compound as long as the equivalent oxidation-potential of free chlorine exists.

Lensen, Rhian, and Stebbins,[34] using partially purified virus and testing for "free" chlorine and chloramine, found that 0.5 per cent virus was inactivated in less than 10 min. when the chloramine residual was as low as 0.05 p.p.m. if the pH was near neutrality. The outcome of their experiments suggests a decrease in the virucidal activity of chlorine with increasing alkalinity of the medium.

A recent survey by Dempster[35] of 121 cities having populations in excess of 25,000 produced evidence of another nature. It was found that cities with deep wells as sources of water supply had the highest case rates over the last 18 years, while those supplied by streams and lakes which would be more subject to contamination had the lowest rates. The lack of water treatment in the case of deep well water might possibly be significant but these wells were reportedly not polluted. Cities with little or no treatment of their water supply had the highest incidence of poliomyelitis and cities treating water by filtration and chlorination or softening had the lowest case rates. This is in general agreement with the report of Casey[36] on studies made in Louisiana. He found that communities with both water and sewerage systems had 26.6 cases per 100,000; those without either water or sewerage had 39.7 cases per 100,000; while those with water but without sewerage had 83.6 cases per 100,000.

In the latter type of community the rate was inversely proportional to the volume of water used, suggesting that large amounts of fluid might

serve as a dilution factor or a factor increasing the rate of flow.

Maxcy[37] has summarized the hypothetical relationship of water supplies to poliomyelitis in an excellent and critical review of the evidence up to 1943. His conclusions were that whether or not these methods of treatment are effective in inactivating or destroying the virus of poliomyelitis the fact remains that it has never been shown that the incidence of this disease is significantly associated with the quality of water supplies, and moreover no explosive outbreak has been shown to be attributed to the simultaneous exposure to a common source of water. Nevertheless, it does not seem impossible that fecal contamination of water in a supply system or a well might be a vehicle of transmission under certain conditions.

In summary, it is necessary to emphasize that, with the possible exception of infectious hepatitis, milk and water, if involved, do not represent the major vehicle in the transmission of any of the diseases herein discussed. The explosive, self-limiting character of certain epidemics of hepatitis, plus the experimental evidence of transmission by ingestion of infected material, points strongly to a common alimentary route of infection probably involving either milk or water supplies. Inclusion conjunctivitis is usually transmitted by direct contact and only occasionally through swimming pool water. Foot-and-mouth disease also is usually acquired through contact with infected animals and rarely through ingestion of dairy products. The exact mode of transmission of epidemic diarrhea of the new-born and of Q fever are unknown. It is not unlikely that milk may play a role in the spread of both these infections.

On the basis of present-day evidence the route of transmission of poliomyelitis seems to be personal association with either the oropharyngeal or the gastrointestinal discharges of infected individuals. Even though fecal contamination when present renders milk and water potential vectors of this virus, the evidence suggests that this mode of spread accounts for only occasional infection.

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# Medical Society Guarantees Universal Medical Care

The Alameda County, California, Medical Society has guaranteed medical care to everyone at a price he can afford to pay. As a part of this program it has added a medical social service consultant to its staff.

The social service consultant will handle requests for medical care from both individuals and health and welfare agencies. Patients who cannot pay will be referred to the Highland-Alameda County Hospital. Those who can afford to pay part of the cost will be referred to the private physicians who have agreed to accept patients under the Medical Association's part-pay plan.

The medical social consultant is Muriel B. Hunter, formerly casework supervisor at the Highland Hospital. She will study the difficulties in securing medical care that individuals and agencies report, as a basis for improving the Association's part-pay plan.

# The Dentist in the National Program of Cancer Control*

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THE critical position of the dentist in cancer control is clearly revealed by two prevailing conditions. First, many people have been educated to the fact that they should visit their dentist at regular intervals, and therefore the dentist has a better opportunity than the physician to examine the apparently well population. Second, a high percentage of persons with symptoms of oral cancer consult their dentist before their physician. This is easily explained by the fact that the early symptoms are seldom marked, and the patient often assumes, because of the nature and location of the lesion, that it results from trouble with the teeth. Histories of oral cancer patients who have applied to the Memorial Hospital in New York show that 60 per cent of those with cancer of the gums consulted their dentists first. It should also be mentioned that the physician may have no occasion to examine the mouth, and unless the patient complains of oral symptoms, an early lesion may go unseen. In order to control cancer, we must search it out, rather than wait for symptoms to lead the patient to seek treatment.

The National Cancer Institute is conducting a survey that will soon give an accurate measure of the cancer problem within the dentist's domain. This is a study of the incidence of all known cancer in ten metropolitan areas, well distributed geographically and representative of various living and working conditions in the United States. A survey of the same areas ten years ago provided information for comparison; so the results are expected to show whether cancer of those areas is increasing or decreasing, whether patients are consulting physicians at an earlier stage of the disease, and whether certain control measures have been effective. During the past summer, New Orleans, Denver, Atlanta, San Francisco, Chicago, and Pittsburgh were surveyed; and the remaining four areas—Detroit, Dallas and Fort Worth, Philadelphia, and Birmingham—are to be completed by the summer of 1949.

Every physician and hospital in the areas studied has received a questionnaire asking for information on each cancer patient observed or treated during a given year. Visits are made to those who fail to respond, and in this way, a high percentage of returns has been obtained. In the 1938 survey, every hospital and all but about 2 per cent of the physicians were represented in the analysis. Comparable success has been attained in the areas recently covered. When the results are analyzed, a detailed picture of the incidence of cancer in representative cities of the United States will be available, and a more accurate description of the cancer problem within the field of the dentist will be presented than ever before.

* Presented before the Dental Health Section of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 10, 1948.

Hospital records indicate that the dentist often fails to recognize cancer in the early stages. About 3 out of 5 cases are missed. Under these circumstances, a considerable amount of time is usually spent in giving some form of dental treatment, which often reassures the patient that his condition is not serious. The result in many of these cases can easily be imagined—in a disease in which delay in beginning proper treatment may mean the difference between cure and death.

The National Cancer Institute, aware that dentists trained to cancer alertness could save thousands of lives a year, has initiated a broad program for assistance in the teaching of dentists and dental students to recognize the disease in its early stages. The first federal grants for this purpose were approved in 1947. Since that time, 34 dental schools approved by the Council on Dental Education of the American Dental Association have been circularized, and all but 5 have applied. Each grant provides up to $5,000 annually for cancer teaching, upon approval of a plan submitted by the school to the National Cancer Institute.

We thought it inadvisable to specify the type of improvement the school should make. Instead, the faculty is asked to review the school's present teaching methods. If a properly integrated course in cancer is not already provided, it is suggested that within the senior year, consideration be given to a curriculum in which the pathology, physiology, and biology of cancer are correlated with a weekly clinic, and that the cancer teaching program be integrated whenever possible with that of the medical school. It is further recommended that the faculty undertake to stimulate cancer research, since research programs have been shown to improve teaching and to stimulate student interest.

You may be interested in hearing how some of the dental schools are using this $5,000 grant for cancer education. A recent example is the grant to the College of Physicians and Surgeons, School of Dentistry, at San Francisco, Calif. The purpose of this project is to collect material relative to malignant tumors of the oral cavity, lips, and maxillae, in order to augment the teaching program. Among other materials collected are histories, intra-oral models, and microscopic specimens with photomicrographs and color transparencies of the lesions. This material will be prepared and organized for demonstration.

At the University of Illinois, in Chicago, the funds will be used to expand the present teaching program in diagnosis, control, and treatment of oral cancer, to coördinate activities of the various medical and dental departments, and to initiate research.

Similar programs have been planned or established in the other dental schools that have received grants. Although the sum is modest, these institutions have been able to supplement their teaching programs in various ways, and I am confident that this will provide cancer education which will strengthen future programs of cancer control.

The National Cancer Institute does not believe that training programs should be confined to potential dentists. On the contrary, it has also been a policy to extend informational services to practising dentists in order to keep them alerted to new developments in oral cancer. Many of you are aware that Service dental consultants are now assigned to every regional office of the Public Health Service. May I urge you to call on them for assistance.

We feel that one of the primary responsibilities of a public health officer —federal, state, or local—is to help instruct the practising dentist in recognition of the disease. Many are already engaged in arranging and sponsoring cancer symposia at meetings of dental

associations. We try to help in this work by supplying materials for visual education. For example, we have prepared a series of transparencies on oral cancer, and have distributed sets to strategic points throughout the country. A more ambitious undertaking, in cooperation with the American Cancer Society, is a series of movies for general practitioners, showing how to diagnose and treat various forms of the disease. One of these films, still in the planning stage, is directed toward the early diagnosis of oral malignancy. This film is planned for release by the middle of 1949.

Now for a few specific suggestions to the dentist who would aid in cancer control: By virtue of his key position in the cancer problem, the dentist has a primary responsibility in the prevention, recognition, rehabilitation, and follow-up of cancer cases. In order to meet this responsibility, he must first develop a balanced index of cancer suspicion. In other words, an appreciation of the extent of the cancer problem that falls within his area is a requisite. An estimated 500,000 persons are under treatment for cancer at any given time in the United States. About 300,000 new cases are diagnosed each year. And with these we must consider the patients who have been treated and cured, an unknown number, and also those whose disease has not been discovered. Roughly 15 per cent of all cancers occur within the range of the dentists—that is, are visible in the region of the head and neck.

These figures do not reflect the prevalence of the so-called "precancerous" lesions, which include benign tumors, leukoplakia, chronic fissures, ulcers, and keratoses. In most cases, these do not develop into cancer, but may do so if allowed to persist. Now, in the dentist's first responsibility — prevention — attention to these lesions is of major importance. The objective in each case should be to correct the causal condition, often a prolonged mechanical irritation. It is important to remove all jagged edges of teeth or fillings; to advise heavy tobacco or snuff users of early changes in the mucous membrane; to perform necessary periodontal therapy; to correct orthodontic anomalies; and to teach correct oral hygiene. These are the main considerations in cancer prophylaxis.

The general dental practitioner, like the general medical practitioner, seldom has an acceptable knowledge of the treatment and clinical course of neoplastic processes. He should be well acquainted with certain signs and symptoms that lead to a suspicion of cancer. As a routine procedure, he should perform a complete examination of the buccal cavity of every patient. If any suspicious lesions are found, palpation with the finger will help to determine the invasive nature of the lesion, by indicating the amount of swelling or induration. The lip is the most prevalent site of oral cancer and should be given special attention.

Although examination of other tissues of the head and neck are outside the dentist's realm, definite malignant signs in those areas may be detected, such as the basal and squamous cell carcinomas of the face. In addition, many subcutaneous tumors and adenopathy are revealed by visible swelling and should be noted.

If there is any suspicion of cancer or incipient cancer, the dentist should refer the patient to a competent physician or surgeon as soon as possible. The progress of an oral cancer is sometimes rapid, and a relatively short delay may considerably reduce the chance of cure. The dentist must realize that his responsibilities do not end with the care of dental anomalies, and that every malignant tumor brought under proper treatment at a sufficiently early stage may mean the saving of a human life.

The dentist who suspects that a patient has cancer may be faced with the question of whether to attempt a diagnosis. The danger of making a diagnosis of cancer from clinical appearance alone should be emphasized. A certain and specific diagnosis, even in advanced cases, can only be made through microscopic tissue examination. Without microscopic confirmation, the use of surgery or radiation that is necessary to effect a cure is unwarranted. Neither the physician nor the dentist is justified in making more than a tentative diagnosis without a tissue examination by a specialist in histopathology. The pathologist's report has been termed the "legal" diagnosis of cancer.

Whether the dentist should consider taking a specimen for biopsy depends primarily upon two factors—an understanding between the dentist and the medical profession in the area, and the dentist's ability to rule out lesions that are unquestionably nonmalignant. The first of these considerations is a problem for the dentists and physicians to settle between themselves. There can be no question, however, that dentists in the smaller communities and rural areas, where physicians are scarce or unavailable, should assume this responsibility. Actually, it may be contended that the well trained dentist is better prepared than the physician to obtain a biopsy specimen from the mouth, because of his familiarity with that site and his special equipment.

As to the second factor, it should be pointed out that sometimes the decision whether a lesion looks enough like cancer to warrant biopsy should only be made in the light of considerable experience. We can say in general, however, that a biopsy should be performed on all suspicious bone cysts, alveolar granulomas, and ulcers or swellings of the gingiva. The dentist should see that a biopsy is done on any ulceration of the tonsils, tonsillar pillars, floor of the mouth, gingival buccal gutter, or hard palate that shows neoplastic characteristics. Generally speaking, the characteristics of oral cancer are ulceration, tumefaction, induration and chronicity. It would take too long to detail the procedure of obtaining the specimen; but I would like to make one point in that regard before leaving the subject: The specimen for biopsy should be obtained with as little trauma as possible, to minimize the danger of spreading the disease.

I mentioned the rôle of the dentist in the rehabilitation of cancer patients. After the patient has been treated by radiation or surgery, the dentist, physician, and plastic surgeon should coöperate in prosthesis. The cured patient's readjustment to himself and to society frequently depends in large measure upon the successful restoration of function and appearance.

The follow-up of treated patients is an important aspect of any cancer control program. For various reasons, patients who have consulted physicians about suspicious lesions often fail to return for further examination or treatment. In these cases the dentist who sees the patient can render valuable assistance in many ways. He can learn, for example, what the physician advised and persuade the patient to act. He can explain why a biopsy is necessary, why the physician is the best judge as to whether the radiation should be given or an operation performed, and why delay or unskillful treatment may prove disastrous. If he learns that the patient has discontinued treatment because of alarming reactions, he can calm him and persuade him to return to his physician or hospital. One of the most important functions of the dentist in follow-up is to ascertain that the patient he referred for diagnosis has followed his advice.

So far, I have discussed in a general way the responsibility of the dentist in cancer control and some additional con-

tributions he can make to the national control program. Naturally, the question arises: By what means is he to do all this? True, the government is lending support to the dental schools, in order to provide educational advantages to the student; but what of the practising dentist? I could mention first the federal grants-in-aid to state health agencies for general health work and for cancer control. Under the latter program $2,500,000 were allocated to the states for fiscal 1949. This amount is distributed at the discretion of the state health agency, and in some instances a portion is budgeted to the state dental officer. It is my personal feeling that the state should allocate a fair proportion of these funds for the extension of educational activities directed toward the dental profession.

Among workers in state health agencies, there is growing recognition of the need for integration of cancer control activities with other operations of the agency. The cancer control officer and his staff must coöperate closely with statisticians, epidemiologists, health educators, public health nurses, state laboratories, the tuberculosis and venereal disease control divisions, the industrial hygiene department, and the dental office. Cancer, like syphilis, is a protean disease, and therefore should interest all departments on whose disciplines it impinges. There can be no doubt that the concentration of every resource upon the cancer problem is producing measurable results.

I have tried to define, in general terms, the rôle of the dentist in the national program of cancer control, and to mention some of the available resources for control activities. The National Cancer Institute solicits your assistance in this program. If the 78,000 practising dentists in the United States are informed of the problem, and prepared to meet it, they can certainly make a forceful attack on one of the gravest conditions facing the world today. It has been estimated that dentists see a fourth of the population every year—35 million patients. If those dentists remember the formula "prevention, early discovery, and adequate treatment," and see that this formula is applied, they will be amazed at the number of cancer cases they can detect, and the number of lives they can save.

# The Industrial Nurse as a Health Counselor in Industry*

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UNTIL about two decades ago industrial nursing developed rather slowly and uncertainly. Its place in the health scene was undetermined; its principles and practices were mainly on an individual basis. Industrial nurses, isolated by the very nature of their work, were hewing out their own trails. In recent years, however, this field has gained rapid momentum. It is today a recognized agency in the program of community health and safety. It is firmly established within industry, no longer an expression of managerial philanthropy, but an integrated factor essential in production and in good human relations. Its place as a distinct branch of nursing is clearly cut.

Out of our experiences over the half century, since Ada Stewart was engaged by the Vermont Marble Company to attend its injured men, we have evolved the principles that must underlie our work. We have banded together into a national body in order to promulgate these principles. Standards for preparation for industrial nursing are emerging. Last May, nurse educators from eleven universities and colleges met with our national association here in Boston to discuss the basic curriculum. Our programs have steadily expanded as the advances of medical science, the science of human relations, and the activities of the public health field have influenced the general concepts of health work. Needless to say, in this growth health counseling has become a major factor in our objectives.

Our work began with the iodine swab in the hands of a nurse. As production methods accelerated and accidents increased, more nurses entered industry. Their tasks were mainly first aid and other ameliorative work. Costs were charged off to kindness or to dire necessity. The industrial physician was, of course, in the scene, first largely on a part-time basis, but lately more and more coming in as a full-time medical director. I shall not attempt to discuss industrial medicine here but in all that is said the presence of the physician is implied. The industrial nurse recognizes that she is a partner in the health team in which only the physician is qualified to diagnose and outline treatment.

The first major change in our work came in the passage of Workmens' Compensation Laws. This legislation, a move in the conservation of man power, reflected a growing social awareness of the value of health and freedom from needless handicap and maiming. With the passage of these laws, industrial health programs moved out of the philanthropic era into one in which they became a reckoned part of production costs. This action moved the medical department from its rather precarious place on the edge of the plant right into

* Presented at a Joint Session of the Industrial Hygiene, Engineering, and Public Health Nursing Sections of the American Public Health Association at the Seventy-sixth Annual Meeting in Boston, Mass., November 11, 1948.

the center of its being, and therefore closer to its man power.

It soon became evident that it was cheaper and better to prevent accidents than to let them happen, and as a result the safety engineer entered the scene. It became evident, too, that illness and disease, both occupational and non-occupational, were more costly in absenteeism and lowered production than were accidents. The medical programs expanded, and the industrial hygienist joined the plant group engaged in protecting the worker. In the course of events another fact became evident. The worker, away from the plant sixteen hours a day, was inseparable from the health and social conditions of his family and community. Industrial health programs and those of the community needed to be more closely related—and today we find an increasing coöperation between the two realms.

World War II marked the second major turn in industrial health programs. The economic and morale value of health work had been amply demonstrated. It was recognized as essential in conserving man power. Industry had learned during the war how to use the handicapped worker effectively. A new philosophy emerged—a recognition of the fact that few persons are physically perfect and that the skilled placement of workers according to their abilities tends to make their disabilities of lesser importance.

When health examinations were first introduced their purpose was to protect industry by excluding workers with defects. This policy cost management the use of valuable workers and it embittered labor.

We are coming now to realize that the best policy is not exclusion but proper placement. Clark Bridges in his excellent text, "Job Placement of the Physically Handicapped," says: "Every worker has some form of disability . . . but nearly every one has more ability than disability. Proper placement brings out the ability and the disability disappears." This advance in industry's employment policies has firmly established the role of health counselor for the nurse. The personnel director must have the close coöperation of the medical department to make his work effective. In the evolution of the industrial health program, the man has emerged from behind his torn hand; it is the man *and* his injury that concern us. No longer is our approach to him a philanthropic gesture but rather one of establishing sound human relations. We recognize that it is not the machine that is most important but the man behind the machine. His good will, his satisfaction with his job, his health and safety, are all prime factors in production.

As this trend increases, the responsibilities and opportunities of the industrial nurse increase. Modern mass production tends to rob a man of his individuality; the medical department helps restore it. Here he is not a number but a person, "Mister" or "Joe"; the interest is not in his productivity but in *him*. The nurse's job becomes more challenging. She uses her nursing skills; maintains smooth relationships with all departments; works in close harmony with safety engineers, industrial hygienist, personnel director; keeps adequate records for the insurance carriers; and also carries on the multitudinous tasks that come under the term of health counseling.

Health counseling in industry has many facets. It may relate to the use of chemicals, to safety devices, or to plant sanitation. It may relate to the man himself in his dietary and other similar needs. It often extends beyond factory walls to the members of his family who are reached mainly through health pamphlets carried home in his pocket. In other words, health counseling in industry is coming to mean atten-

tion to the worker's environment as well as to the man. Health education in industry, as health education in the community, requires the coöperation of the individual. The public health nurse entering the home may give nursing care or there may be no need for it; but in all instances she teaches the lessons of personal hygiene and home sanitation. She tries to remove the obstacles of ignorance, social and other problems, and physical conditions that bar the way to family coöperation in the community health program.

The industrial nurse follows these same principles. She uses the occasion of the employee's visit to the clinic to give individualized instructions relating to his particular situation. But she may also use the occasion to enlist his cooperation in a campaign against tuberculosis, veneral disease, or alcoholism. Industry will make notable contributions to our knowledge of rheumatism, arthritis, cancer and similar diseases, as its research programs gather impetus, and the nurse in her contact with the individual can be a pivotal agent in this area. As she teaches, she learns, an inevitable concomitant. Her contact with the employee is often in a health, rather than a sickness situation, as for example, care for his cut finger. The slight symptom seemingly unimportant, revealed in casual conversation or in response to skilled questioning, may have a twofold significance. It may lead to medical supervision over a serious condition but it may also furnish the researcher with valuable clues. An employee may complain of frequent headache, and examination reveals eyestrain. It is the nurse's business to learn if the trouble lies with the lighting at his post or with his disregard of the protective devices that have been provided. It is her task to support and reinforce the safety instructions given by the foreman and safety engineer.

Her relationships in the plant give her an unusual opportunity for teaching personal hygiene. She represents management, yet she is also a fellow worker. She is on both teams and she is trusted as a friend. An employee comes in for attention to a sliver. He remains to ask advice on a health problem in his home or to be instructed in some indicated lessons of personal hygiene. Visits to his home, either at his request or because he needs care, yield even greater opportunities for this instruction.

Organized health classes, well implemented with films, charts, pamphlets, are another potent source of health education. When well planned they are popular and highly productive and they are increasingly finding favor both with management and labor. Regular contributions to the plant publication by the medical department are also a common and useful device in health education. Adapted to seasonal conditions, such as a polio epidemic, they reach not only the worker but his family.

The nurse as health counselor has also an important part to play in accident prevention. Accidents, in the main, are not due to employees' physical defects. Rather they tend to occur with those who have the ***habit*** of accident. So well recognized is this fact that in some industries it is the policy to transfer to other jobs the worker who has had two identical, lost-time accidents. Counseling here is of paramount importance, as the nurse in conference with the employee, tries to determine the cause of his accidents and prevent their recurrence. Fatigue, home problems, maladjustments of various types all have an influence here.

The nurse's presence on the safety committee enlarges her counseling service, beyond concern with the individual, to the total plant. More and more, she is being brought into coöperation with the total plans of worker protection,

organized by the safety engineer, the industrial hygienist, and the personnel director. And more and more we are integrating the industrial health programs with those of the community. A person discovered with a medical defect during preplacement or routine examination is counseled confidentially and referred either to his personal physician or to community resources.

The nurse is conscientious about preserving the man's right to privacy, while at the same time safeguarding the health of other workers. As the community reaches into in-plant programs such as mass surveys, the counseling ability of the nurse is demonstrated in the degree of coöperation obtained from the workers.

The work of the nurse as a health counselor in industry is now unevenly developed because it is our newest phase of service. Some nurses have been unable to incorporate any of the specific activities I have outlined as health counseling. Others have been able to develop even more. These inequalities will level off as management more and more realizes the values of health counseling. The history of the development of industrial nursing gives a solid foundation for our belief that health counseling has a permanent place in the industrial health program.

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# New York Incorporates Its Annual Health Conference

Herman E. Hilleboe, M.D., M.P.H., New York State Commissioner of Health, announced on April 15 that New York State's Conference of Health Officers and Public Health Nurses was incorporated as the Annual Health Conference, Inc.

According to Dr. William A. Brumfield, Jr., First Deputy Health Commissioner and President of the Conference Board of Directors, the corporation was formed because of the growing importance of the conference to workers in the public health field. The conference will hold its 1949 meeting at Lake Placid, June 20–23, marking the 45th session of the conference, which attracts an attendance of more than 1,500.

Besides Dr. Brumfield, the officers include:

*Vice-President* — Dr. Robert H. Broad, Binghamton

*Secretary*—Dr. Granville W. Larimore, Albany

*Treasurer*—Clifford C. Shoro, Altamont

*Directors*—Mary E. Parker, Albany; Mary H. Parks, Albany; Elizabeth Parkhurst, New Lebanon Center; Marguerite J. Queneau, Albany; Dr. W. E. Ayling, Syracuse; Robert W. Osborn, New York City; Dr. David B. Ast, Albany; Earl Devendorf, Schenectady; Walter D. Tiedeman, Elsmere; Dr. John K. Miller, Albany.

# School Health Services*

## A Report from the American Academy of Pediatrics Study of Child Health Services

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HEALTH services for the child of school age have tended to center at the school, first because children are concentrated there and thus can be easily reached, and second because the school situation offers an excellent opportunity for health education. In general terms, the objectives of school health services may be defined as the protection of the health of the child of school age, the development of a health consciousness for the child and his parent, the early detection of impaired health, and some sort of follow-up system to assure that defects found at the time of health examinations receive prompt attention.

In order to obtain information in this important field, a study of certain aspects of school health services has been included in the comprehensive, nation-wide study of child health services now completed by the American Academy of Pediatrics, with the cooperation of the Federal Security Agency's Public Health Service and Children's Bureau. At national, state, and local levels, facts have been gathered with a definite purpose in mind: to provide the tools with which to improve child health, not only for the country as a whole but for local communities. Therefore, certain of the data have been tabulated for each of the 3,000 counties. The findings of this study are now being reported in summary for the country as a whole[1] and in more detail for the individual states.

It should be clearly understood that the study has not attempted to gather data on all aspects of a complete school health program. Services may cover a wide range. Health education, provision for sanitary school environment, control of communicable disease are among the aspects not included in the study.

For the purposes of this paper, the following items have been selected for consideration: (1) the lack of school health services for large areas of the country and for a large proportion of the child population, (2) the division of responsibility between health and education agencies, (3) the frequency of medical examinations and the types of special tests included, and (4) the personnel active in school health programs.

### LACK OF SCHOOL HEALTH SERVICES IN COUNTIES AND STATES

We have distinguished between "school medical services" and "school nursing services" and have included under the former only those in which a physician examines children at the

* Presented before the American School Health Association at the Seventy-sixth Annual Meeting of the American Public Health Association in Boston, Mass., November 8, 1948.

school itself for purposes other than for athletic teams.

It is recognized that in some places, instead of service being given at the school, children are referred to their own physicians or a physician who is paid by the agency responsible for the school health service. Both these methods—service provided at the school and referral to private physicians—have their proponents and advantages. We did not undertake to evaluate their comparative merits, nor did we consider it practical to include in the study of school health services the services given outside of the school.

In planning for the collection of material on school health, the number of children examined was not considered a reliable index of the amount of service. In many school health programs no individual records are kept, so that a proper count of examinations cannot be made. In this type of program, children are lined up for an "examination" which is, at best, a mere "inspection." To add a thousand such examinations from one program to 25 in another, consisting of careful and complete examinations on children selected by teacher or nurse for special care, seemed to confuse rather than clarify the issue. In some systems, nurses' or teachers' examinations are lumped in with physicians' examinations. It seemed wiser, therefore, not to attempt a count of something which is at present as heterogeneous as the school health examination.

The amount of school health service is presented in terms of the presence or absence of the service, county by county. Complete coverage has not been possible. Administration of the service is often not on a county basis but on a school district, or even individual school basis. The proportion of the child population of a county thus covered is unknown. The smallest population base with which we could work on a national basis was the county.

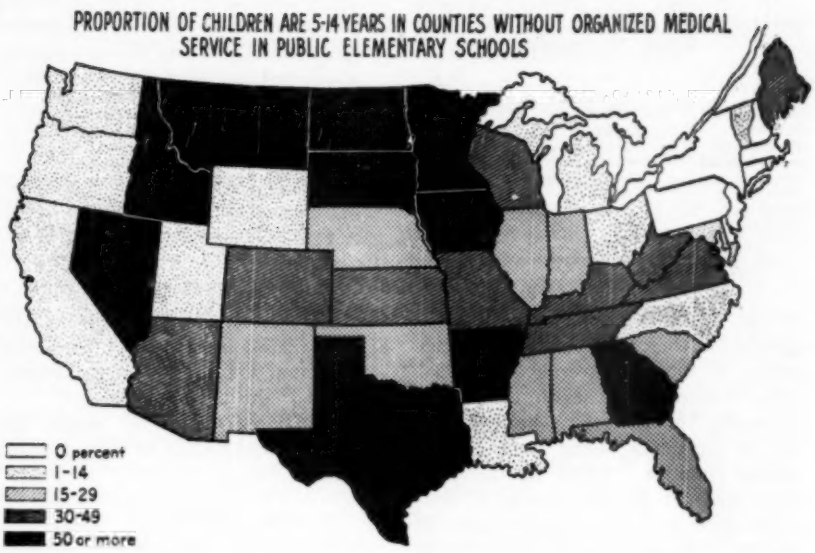
A county is said to be without school health service if there is not at least one public elementary school in which children are given a medical examination by a physician. For example, if a county should have 100 elementary schools and only 1 of these should have provision for health examinations, this county would be listed as having school health services. Thus the positive statement of how many counties *have* school health services is a gross over-statement. The negative statement of how many counties *do not have* school health services has more meaning.

In the United States as a whole, one-half of the counties (1,545) had no organized system of medical examinations, as defined above, in their public elementary schools in 1946. One-third of the counties had neither medical nor nursing service.

The question naturally arises as to whether the counties which lack service are mostly rural and sparsely populated areas in which there are few children and few schools. It is a fact that metropolitan areas are better covered in this respect than isolated rural areas. Of the counties, which for the purposes of this study we have classified as greater metropolitan,* there were practically none which were without some organized school medical service; of the counties which we have classified as isolated rural, 68 per cent lacked such service. But if we look at the situation from the point of view of child population, we find nearly 5,000,000 children, 5 to 15 years of age, 22 per cent of all children of this age group, in the counties without this service.

On a state by state basis there is a

* For definition of county classification as used in this study see: Hubbard, John P., Pennell, Maryland Y., and Britten, Rollo H. Health Services for the Rural Child. *J.A.M.A.* 137:337–343 (May 22), 1948.


PROPORTION OF CHILDREN ARE 5-14 YEARS IN COUNTIES WITHOUT ORGANIZED MEDICAL SERVICE IN PUBLIC ELEMENTARY SCHOOLS
0 percent
1-14
15-29
30-49
50 or more

wide range in regard to the proportion of child population in counties having no organized medical service in public elementary schools. In 8 states there were no counties which did not have at least some such service; 10 states had more than half of their counties uncovered.

### ADMINISTRATION OF SCHOOL HEALTH SERVICES

The administration of school health services is a matter of controversy between health and education authorities. There is agreement on some aspects, as for example, that health education is primarily a job for education authorities and that control of communicable diseases should rest with the health agency. In order to throw some light on this issue, we included information on the administrative pattern of agencies in operation at the local level. The major difficulty in such an undertaking lies in the definition of what constitutes an agency. For education, this is usually the school authority serving a school district. The public elementary schools

TABLE 1

*Counties Without Organized Medical Service in Public Elementary Schools, and Children Age 5–14 Years in Those Counties (1946)*

| County Group | Total Counties | Counties Without Service | | Total Children | Children in Counties Without Service | |
|---|---|---|---|---|---|---|
| | | Number | Per cent | | Number | Per cent |
| Greater metropolitan | 63 | 2 | 3 | 5,036,774 | 31,312 | 1 |
| Lesser metropolitan | 177 | 23 | 13 | 5,291,917 | 335,360 | 6 |
| Adjacent | 668 | 306 | 46 | 3,634,300 | 1,167,250 | 32 |
| Isolated semi-rural | 1,116 | 494 | 44 | 5,896,405 | 2,101,931 | 36 |
| Isolated rural | 1,052 | 720 | 68 | 2,137,017 | 1,295,539 | 61 |
| Total | 3,076 | 1,545 | 50 | 21,996,413 | 4,931,392 | 22 |

TABLE 2

*Listing of States According to the Proportion of Child Population (5–14 Years) in Counties Having No Organized Medical Service in Public Elementary Schools*

| *0 Per cent* | *1–14 Per cent* | *15–29 Per cent* | *30–49 Per cent* | *50 or More Per cent* |
|---|---|---|---|---|
| Connecticut | California | Alabama | Arizona | Arkansas |
| Delaware | Louisiana | Florida | Colorado | Georgia |
| Massachusetts | Maryland-D. C. | Illinois | Kansas | Idaho |
| New Hampshire | Michigan | Indiana | Kentucky | Iowa |
| New Jersey | North Carolina | Mississippi | Maine | Minnesota |
| New York | Ohio | Nebraska | Missouri | Montana |
| Pennsylvania | Oregon | New Mexico | Tennessee | Nevada |
| Rhode Island | Utah | Oklahoma | Virginia | North Dakota |
| | Vermont | South Carolina | West Virginia | South Dakota |
| | Washington | | Wisconsin | Texas |
| | Wyoming | | | |

in a city are generally served by a single agency, but there may be many agencies within a county, covering individual school districts. For health, the picture is usually the reverse, a health jurisdiction frequently being made up of several counties. There is, therefore, some tendency for the number of education agencies to be multiplied and the number of health agencies to be reduced in relation to the same areas. Recognizing the limitations of the use of "agency," it is seen in Table 3 that there is a fairly even division between official education and official health agencies. About 11 per cent of the agencies have been classed as under joint administration by official education and health agencies together.

This pattern is not, of course, the same everywhere. There was a much

TABLE 3

*Agencies Giving School Medical Service*

| | *Number* | *Per cent* |
|---|---|---|
| Official education | 1,271 | 45 |
| Official health | 1,173 | 41 |
| Joint official education and health | 323 | 11 |
| Other | 84 | 3 |
| Total | 2,851 | 100 |

TABLE 4

*Per cent of Agencies by Sponsorship in Each County Group*

| | *Official Education* | *Official Health* | *Joint Official Education and Health* | *Other Agencies* |
|---|---|---|---|---|
| Greater metropolitan | 69% | 9% | 17% | 5% |
| Lesser metropolitan | 63 | 23 | 11 | 3 |
| Adjacent | 30 | 34 | 12 | 4 |
| Isolated semi-rural | 28 | 61 | 9 | 2 |
| Isolated rural | 16 | 71 | 10 | 3 |

TABLE 5

*Frequency and Types of Examinations by Different Sponsoring Agencies*

| | *All Agencies* | *Official Education* | *Official Health* | *Joint Official Education and Health* | *Other* |
|---|---|---|---|---|---|
| Medical examinations: | | | | | |
| All pupils once a year | 36% | 64% | 10% | 22% | 40% |
| Certain grades once a year | 41 | 26 | 53 | 56 | 40 |
| Only referrals by teacher or nurse | 23 | 10 | 37 | 22 | 20 |
| | 100 | 100 | 100 | 100 | 100 |
| Special examinations done routinely *: | | | | | |
| Vision tests | 91% | 96% | 86% | 91% | 91% |
| Audiometer | 54 | 76 | 28 | 62 | 49 |
| Tests for tuberculosis | 26 | 24 | 28 | 22 | 44 |

* Annual testing of all pupils, certain grades, or new pupils

greater tendency for education authorities to provide the service in metropolitan counties and for health agencies to be responsible in isolated counties.

### FREQUENCY AND TYPES OF EXAMINATIONS

Another controversial subject in school health is the frequency with which examinations should be given. We undertook to determine the present practice, that is, whether the policy of the agency was to examine (1) all pupils once a year, (2) certain grades once a year, or (3) only on referrals by teacher or nurse. Though the practice was divided fairly evenly among these three patterns, emphasis appears to be given by education agencies to examining all children yearly, while the health agencies appear to be more selective in examinations.

Attention was directed specifically to the extent to which children are examined for vision, hearing, and tuberculosis. Practically all (91 per cent) of the agencies reported routine testing of vision; only about a half (54 per cent) routine and audiometer testing of hearing; and about a quarter (26 per cent) testing for tuberculosis either by x-ray or tuberculin.* It is a matter of considerable interest that official education agencies demonstrated more concern over testing for vision and hearing than the official health agencies. This is particularly true in respect to the audiometer testing; 76 per cent of the official education agencies gave routine audiometer tests in comparison with 28 per cent of the official health agencies. In respect to testing for tuberculosis, the score was low for both health and education agencies, with the former having a slight edge—28 per cent in comparison with 24 for the education agencies. There was a rather even distribution between those agencies which used x-ray examination and those which tested with tuberculin only.

### PERSONNEL ACTIVE IN SCHOOL HEALTH PROGRAMS

Much of the school medical work is done by part-time physicians, either health officers (who may be full-time officers but devote only a part of that time to school work), or practising physicians who give varying proportions of their time to the schools. In adding together all the physicians giving school medical service, equal weight was given to a man devoting full time to the job and one giving one hour per week. Nor was it possible to obtain a completely unduplicated count. If a health officer or practising physician served more than one agency, he is undoubtedly counted more than once. No way out of this dilemma was found.

Of the 8,000 physicians serving in the schools about 20 per cent were health officers. The per cent of health officers working in the schools is comparatively small in metropolitan counties increasing as one goes out from these centers to the isolated rural counties. In the greater metropolitan counties 3 per cent of the physicians were health officers in comparison with 59 per cent in isolated rural counties.

About 38 per cent of the total physicians were employed by the official education agency in comparison with 31 per cent by the official health agency. The remaining one-third were employed by the official health and education agencies jointly.

Of the large majority of those physicians who were not health officers (6,390), 94 per cent were general practitioners and 4 per cent pediatricians. Thus the pediatrician plays a relatively small role in school health programs.

About 11,700 nurses gave some time to the schools, usually as a part of a general public health program. Some-

* Annual testing of all pupils, certain grades, or new pupils.

what over one-third (38 per cent) of these nurses were employed full time to work in the schools. About 40 per cent were employed by the official health agency; only slightly less being employed by the official education agency; and most of the rest being employed by official health and education agencies jointly. Again we find the southeastern region at variance with the practice throughout the country as a whole. In this region the large majority (85 per cent) of the school nurses are employed by the official health agency.

## CONCLUSION

In closing, it should be pointed out that the information presented here is only in the nature of a general summary of the data collected during the course of this study in relation to school health services. More complete data will be found in the national report already referred to and in the reports of the study being published separately by the individual states.

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*Vol. 39*

# American Journal of Public Health

*and* THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 39 June, 1949 Number 6

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## IS AREA ERADICATION OF TUBERCULOSIS POSSIBLE?

IN a paper published in this JOURNAL in 1937, Wade Hampton Frost [1] presented a thoughtful appraisal of the question "How Much Control of Tuberculosis?" After marshalling the available evidence, he came to the conclusion that in this country we had already reached a stage at which the biological balance was against the survival of the tubercle bacillus and that eventually the mortality from this disease would be reduced to the vanishing point.

A contrary conclusion was drawn from British experience by Major Greenwood. At the end of his chapter on tuberculosis in his book *Epidemics and Crowd Diseases*, also published in 1937, he asserted that: "Without doubt it is idle to speak of the conquest of tuberculosis; tuberculosis has not been and so far as one can see never will be conquered." This opinion recently received an endorsement from Medlar [2] who was impressed with the frequency of his finding of tuberculous pulmonary lesions unrecognized during life in persons in the older age groups coming to autopsy in New York City.

The question of the validity of Frost's thesis is of great practical as well as theoretical importance. His reasoning was briefly this: There were many and sound reasons for doubting that the rapid and general decline in tuberculosis in the preceding half century had been due *principally* to the measures which had been taken for the specific purpose of preventing infection. Without question the complex group of factors included under the terms "advancing civilization and better living conditions" had played an important role. There was reason to believe, however, that the decline was due *in some part* to the direct efforts made to control the disease.

The direct attack has proved to be a more formidable undertaking than was at first realized, but in Frost's words: "If the effective control of tuberculosis required *complete* isolation of *all* open cases throughout the whole of their open stage, the present (i.e., 1937) status could not be considered encouraging, for a large proportion of such cases are discovered only after they have reached a fairly advanced stage, and the isolation even of cases known to the health authorities is probably less than 50 per cent complete. However, for the eventual eradication of tuberculosis it is not necessary that transmission be *immediately* and

*completely* prevented. It is necessary only that the rate of transmission be held permanently below the level at which a given number of infection-spreading (i.e., 'open') cases succeed in establishing an equivalent number (of 'open' cases) to carry on the succession. If, in the successive periods of time, the number of infectious hosts is continuously reduced, the end result of this diminishing ratio, if continued long enough, must be extermination of the tubercle bacillus."

He placed a single qualification upon his conclusion to the effect that "As to the maintenance of this balance, favorable to us, unfavorable to the tubercle bacillus, there are, of course, elements of uncertainty, among them uncertainty as to the stability of our civilization."

Only twelve years have passed—too short a period upon which to base inferences in regard to long-time trends. Yet it has been a critical period in which the very existence of civilization has been threatened. The world has undergone one of the greatest military, social, and economic upheavals in history. It is, therefore, pertinent to review the experience of this decade and inquire whether the Frost thesis is still tenable.

Despite their limitations, mortality rates provide the best available index of the biological balance in different countries over long periods of time. During the war years, mortality from tuberculosis in most of the western Europe nations involved in the conflict increased, while those countries that escaped the rigors of war were little affected. Thus, in western Germany there was a marked rise succeeded by a decline in the first two post-war years, but the rate is still higher than in 1938. In Belgium and the Netherlands, on the other hand, the rate rose sharply during the war, but by 1946 was already down to or below the 1938 level. England and France experienced moderate increases in mortality early in the war, but their rates were well below the pre-war level in 1946. In Denmark, Sweden, and Switzerland, mortality continued downward during the war. In the United States as a whole, mortality has continued to decline at approximately the same rate as that of the past quarter century. In some states and cities it has declined more rapidly than others. In only a few localities and population groups has the downward trend become definitely retarded.

It appears, therefore, that the disturbances due to the war, which were profound in some of the countries of Western Europe, have been insufficient to affect more than a temporary setback in a process of declining death rates. This lends support to the view that in certain areas of the world, where civilization is relatively advanced, the biological balance is still against survival of the tubercle bacillus.

To what extent this is due to indirect socio-economic causes or directly to control measures is a question as difficult to answer now as it was in 1937. In the United States, progress has been made in the development, and more particularly in the application, of more effective measures of control despite the war—in some respects, because of it—notably in the screening of millions of recruits by the military services, and bringing under medical care those found to have tuberculosis. Methods of treatment, of immunization, and of case finding have been improved. It is appropriate to inquire in what manner these advances may have affected the biological balance.

In the field of specific therapy the most important contribution was, of course, the discovery of streptomycin. This antibiotic is now receiving extensive clinical trial. Its values and limitations are becoming apparent. While its suppressive action has been demonstrated in tuberculous meningitis and miliary tuberculosis,

it has been somewhat disappointing in treatment of the pulmonary form of the disease, the form which is biologically essential to the dissemination of the tubercle bacillus. This experience does give hope, however, that eventually an antibiotic may be discovered and be made practicably available which will suppress growth of the microörganism in the tissues and rapidly terminate the infectious state in pulmonary tuberculosis. With such an agent, the seedbed of the disease could be more rapidly reduced.

The search for a practical and effective method of artificial immunization has progressed. The technique of production, standardization, and administration of BCG vaccine has been improved. Vaccination with this agent has had widespread trial in Europe and South America. Its safety under properly controlled conditions has been established. Critical trials (such as those reported by Holm; Ferguson; Rosenthal, Leslie, Loewinsohn; Aronson and Palmer) support the judgment that this procedure affords a considerable degree of protection against post-primary tuberculous lesions for at least a few years after vaccination. Its long-range effect in reducing the incidence of pulmonary tuberculosis has yet to be determined. For this reason, in the United States, the procedure is still under investigation, and the vaccine has not been made commercially available.

Thus, so far as public health practice in this country is concerned, the past ten years have brought forth no really new principle of prevention, although prospects for the future are bright. The main objective, as Frost stated it, is still avoidance of exposure, and the strategy is still that of a frontal assault on discoverable sources of infection.

This leads us to inquire what progress has been made in "case finding" and isolation. The tools used in diagnosis have undoubtedly been sharpened. Interpretation of the tuberculin test has been rendered more accurate by quantitative studies. Recovery and identification of the tubercle bacillus is accomplished with a greater degree of refinement by concentration, culture, or animal inoculation of gastric contents as well as sputum. The errors inherent in the reading of x-ray films have been explored and taken into account. Non-tuberculous causes of pulmonary calcification have been shown to be more frequent than was formerly supposed, at least in certain parts of this country.

Technical advances in radiography have made it practicably possible to screen large groups of the population for evidence of pulmonary pathology. Well directed "mass surveys" are undoubtedly of potential value in the early discovery of "open" cases of pulmonary tuberculosis. Their actual value depends upon the thoroughness of the follow-up and the extent to which persons with suspicious lesions are subjected to careful medical examination and observation. Further, their biological effectiveness will be determined by the adequacy of local provision for prompt medical care and the isolation of "open" cases which are discovered. Actually, this varies widely in different parts of the United States, and leaves much to be desired in many areas.

The need for sanatorium beds has by no means been satisfied everywhere. The effort to maintain hospital isolation of patients over the long periods of time required for treatment and to reduce the proportion who are discharged "against advice" is successful to a varying degree in different hospitals, but can never be completely so because of the very nature of human beings. Probably more than half of the patients who are discharged are bringing up tubercle bacilli, even though in most instances intermittently and in small numbers.

While there are still manifest deficiencies in the preventive program as it relates

to case finding and isolation, it is better than it was a decade ago. There are many and sound reasons for believing that the level of effectiveness attained in many areas is sufficient to constitute an increasingly important factor in progressively reducing the frequency of transmission from infected to non-infected individuals.

Granting continuation or strengthening of control efforts in addition to favorable socio-economic developments in a world at peace, it would seem not unreasonable to expect that the balance, favorable to us, unfavorable to the tubercle bacillus, will be maintained and that the decline in mortality from tuberculosis will be sustained, even to the point of disappearance from some areas. There is nothing in the record up to date that is inconsistent with Frost's thesis.

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## THE ACADEMY OF PEDIATRICS STUDY

ONE of the most outstanding public health pinnacles of 1949 is the report of the Academy of Pediatrics on Child Health Services and Pediatrics Education.[1] At a cost of one million dollars, the Academy (with the aid of the U. S. Children's Bureau, the U. S. Public Health Service, and private foundations) has completed an exhaustive and revealing survey of the actual status of health care for children in the United States. We shall present an expert review of the findings in a later issue of the JOURNAL; but it is none too soon to congratulate the Academy on a remarkable piece of public service.

Dr. Thomas Parran, Dean of the School of Public Health at Pittsburgh, pointed out at a meeting of the Academy on April 2 how significant this service has been and how naturally it grows out of the general philosophy which has governed the activities of the Academy in the past. He told the members of the Academy "because you have kept abreast of the profession and have not been among those dragged captive and shrieking behind the chariot of social progress, you are in a far better position to shape your own future than those who have been less foresighted."

The Academy, in projecting its study desired to learn whether there were a large number of children in the United States who were not receiving preventive and curative care compatible with present standards of good pediatric practice. If such were the case it sought to estimate whether the lack of adequate care was due to one or more of the following factors: "(1) parents are unable to pay for good service; (2) there is an unwillingness to use, or lack of knowledge of, available facilities; (3) services are not available where many children live; and (4) there are not enough physicians well trained in the medical care and health supervision of children, especially in rural areas."

The study demonstrates beyond question that all the factors mentioned are actually operating to the grave detriment of the health of our children. It is clear that mothers must be conscious of the need for good health care and that many are not now conscious of that need. The remedy is health education. It is clear that the care must be available where the children are; and this is not the case in our rural areas. The remedy is planning for hospitals and health centers and public financial support for their construction and maintenance. It is clear that funds must be available to pay for care; and such funds are not available for moderate

and low income groups anywhere in the United States. The remedy can only be found in prepayment of the costs of medical care on a voluntary or universal basis, or tax supported services, or a combination of the two programs. It is clear that popular interest and physical facilities and funds cannot operate successfully while there are not enough well trained physicians (not only pediatricians but general practitioners), especially in rural areas. It is to this latter problem that the Academy logically directs its major emphasis; and half the report deals with the problems of undergraduate and graduate training of physicians in this field.

The responsibility for implementing practical measures for improvement has been assigned by the Academy to a continuing Committee for the Improvement of Child Health. This report has made a case which calls for action. As Dr. Parran said, on an earlier occasion, "The Academy of Pediatrics took upon itself a heavy responsibility in making the survey; for that step inevitably obligated them to take a second and far more difficult step; viz., to use this knowledge to develop a national program of child health services."

But this obligation does not rest only on the Academy of Pediatrics. It rests on every public health worker of the country. It rests on every citizen in every state and every town. "In a nation untouched by bombs, unravaged by famine, not the prey of war-borne epidemics, three babies died for every soldier killed in combat during World War II." To quote once more from Dr. Parran, "There is a time to stand and there is a time to strike. There is a time to feel out the situation and a time to move forward. This is your hour."

REFERENCE

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## THE A.S.H.A. GOES TO WAR

A LITTLE less than a year ago, Oscar R. Ewing, Federal Security Administrator and Chairman of the U. S. Interdepartmental Venereal Disease Control Committee, wrote to President P. R. Mather of the American Social Hygiene Association to request that the Association assume the following responsibilities:

"To act as advisor to Central Armed Forces Disciplinary Control Board of the National Defense Establishment in matters pertaining to civilian community education and the repression of prostitution.

"To continue and expand services to supply confidential data regarding prostitution conditions in the environs of military establishments.

"To give consideration to performing the functions of the Federal Social Protection Division, which no longer exists.

"To make available to the Armed Forces, on request, educational material and advisory services.

"To bring citizen support to good law enforcement, social treatment and individual health education through the home, the church, and the school."

The response of the A.S.H.A. was prompt and effective. Funds for the enlarged program have been obtained from the United Service Organizations. During the summer of 1948, the Association recruited, trained, and assigned to field positions a highly competent group of workers. A Washington Liaison Office was opened on September 1. By October 1, field offices were established in Chicago, Atlanta, San Antonio, and San Francisco, and the national headquarters in New York was expanded to house field representatives for the New England and Central Atlantic States. Additional scientific field assistants were assigned for

confidential studies of prostitution and related conditions. After the project had been in operation for only three months, improvements in local conditions already had been noted. In one Middle Atlantic port city of great importance to the Navy, local authorities have been stimulated to close up numerous vicious resorts frequented by servicemen. In a New England city several notorious taverns, long places of encounter of Navy men with prostitutes, have been placed "off limits" for members of the Armed Forces. A Texas city near large Army and Air Force establishments has closed most, if not all, brothels frequented by servicemen. Work is progressing in many other communities which are "leave areas" or visited by large numbers of soldiers, sailors, and airmen for any reason.

In response to a request from the Interdepartmental Committee, a team of scientific field workers spent a month in a survey of 12 Alaskan cities where prostitution was an unusually serious menace; and the results of this study will be used by the U. S. Public Health Service in prompt remedial action.

The war against venereal disease is not of the refrigerated type.

## FIVE YEARS OF THE SUBCOMMITTEE ON MEDICAL CARE

IN 1944, the title of our Subcommittee on Organized Care of the Sick (a subcommittee of the C.A.P.) was changed to the Subcommittee on Medical Care. Dr. J. W. Mountin carried over as chairman; and his recent retirement[1] from the post makes it appropriate to recognize the remarkable achievements of the subcommittee during the past five years.

It was to this group that we owe the draft statement on "Medical Care in a National Health Program" adopted as an official statement of policy by the Association in the fall of 1944,[2] which remains a document of the first importance, as valid in facing the problems of 1949 as it was when first drafted.

The subsequent work of the subcommittee[3] has been no less noteworthy.

The subcommittee played a leading part in providing the staff work underlying the joint statement on "Planning for the Chronically Ill," adopted by the American Hospital Association, the American Medical Association, the American Public Health Association, and the American Public Welfare Association in 1947, and the statement on "Coördination of Hospitals and Health Departments" adopted by the American Hospital Association and the American Public Health Association in 1948.

Through its own staff, the subcommittee has undertaken studies of especially significant program developments, demonstrations, and trends in the field of medical care. These include a detailed study of "The Maryland Medical Care Program," and a review of the Bingham-Rockefeller program to improve the quality of medical care in Maine and Massachusetts entitled "Regionalization in New England." Two more reports, one on "The Quality of Medical Care in a National Health Program" and one on "Medical Care Activities of Full-time Health Departments" will appear in this JOURNAL during the next few months.

The vital health blood of our Association comes from the outstanding contributions of its standing committees and their subcommittees. Among these contributions those of Dr. Mountin and his associates and their keen and able staff rank very high.

REFERENCES

1. Succeeded by Dean A. Clark.
2. *A.J.P.H.* 34:1252 (Dec.), 1944.
3. Aided by a grant from the International Health Division of the Rockefeller Foundation.

## LETTERS TO THE EDITOR

TO THE EDITOR:

Dr. Dublin's paper which appeared in the December issue of the *Journal*, "A Centennial of Public Health," reminded me of the even earlier legal establishment of a Board of Health for the City of Mobile than that of London. In gathering material for the January, 1939, issue of the bulletin of the Mobile County Board of Health, I ran across a record of an Act of the Legislature of Alabama, dated December 21, 1841, granting a Charter to the Mobile Medical Society. Section 6 of that Charter established the Society as a legal agency of the City of Mobile, and required it to organize a Board of Health and to procure necessary information upon the health of the City and the precautionary measures necessary to preserve the same.

We have the Minutes of the Mobile Medical Society covering its organization meeting on June 12, 1841. In these there is a Resolution to petition the Legislature at their next session for an act to incorporate the Mobile Medical Society. At an adjourned meeting on June 21, 1841, it was resolved that the President, Vice President, and Secretary of this Society constitute the Board of Health for the City of Mobile, and that the Mayor and Aldermen be requested to invest them with the proper authority of a Board of Health. On that same day the temporary Secretary of the Society wrote to the Mayor and Aldermen and advised them of the action of the Society. He gave the names of the "gentlemen composing this board" as Dr$^{s}$ S. Mordecai, President; H. S. Levert, Vice President; Jesse Carter, Secretary. We find under date of June 22, 1841, the following Resolution by the Mayor, Aldermen, and Common Council of the City of Mobile: "that Doctr$^{s}$ S. Mordecai, H. S. Levert, & Jesse Carter constitute for this Municipal year a Board of Health for the City and that they be and are hereby invested with all the Authority conferred by An Ordinance constituting and establishing a Board of Health, passed on the 28th of January 1828; and that they be authorized to select from their number who shall be resident, visiting and consulting physician as required by said ordinance . . ." This was not enough, however, and there followed the State Legislature's legal establishment of the Board as referred to above.

We have not found any ordinances of the City of Mobile relative to the legally established Board of Health which indicate the exact year of their adoption. We do have, however, a volume of ordinances in force in 1858, and it contains at least three articles on health. Article I in Section 135 ordains "that it shall be the duty of the board of health in the city of Mobile, organized and appointed, under the provisions of an Act of the legislature of the State of Alabama, incorporating the 'Mobile Medical Society', passed December 21st, 1843 [the year of printing, we suppose—or a mistake] to prescribe and enforce such rules and regulations as in their opinion, may conduce to the health of the city.

"To examine into any and all cases of malignant, infectious, pestilential, and epidemic diseases, which may originate in the city, and the cause thereof.

"To enforce such measures as they may deem necessary to effect the removal of, or to check the same.

"To examine into all such nuisances

as may tend to affect or endanger the health of the city.

"And to report weekly to the mayor, aldermen, and common council of the city.

"Section 136. That if any person neglect or refuse to comply with the requisitions of the board of health, or shall prevent any member of the board from examining the yards, lots or outhouses of any person in which there is cause to believe that nuisances exist, he shall be fined ten dollars."

There are much longer articles on the subjects, "Duty of Citizens," and "Quarantine." In the article on quarantine the Board of Health was given the responsibility of advising the mayor.

Dr. Jerome Cochrane undoubtedly had the Mobile Board of Health in mind when he proposed to the Medical Association of Alabama that it offer to assume the functions of a State Board of Health.

O. L. CHASON, M.D.
*Health Officer, Mobile, Ala.*

March 22, 1949.

TO THE EDITOR:

*Are We Not All Community Health Educators?*—Education may normally be considered one of the functions of a health administrator or health director. In larger health departments, because of the multiplicity of tasks or duties which a health officer has to direct or supervise, it has become necessary to delegate to responsible assistants the direction of certain programs. Health education is one such grouping.

Whether the term "health educator" as applied to some one person on a health department staff is a "happy" designation is open to question. Actually every member of a health department staff is a health educator; otherwise he has no business being on the health department team. Thus to designate some one person *the* health educator is somewhat confusing.

The term health coördinator is sometimes applied to such a specialist, and if the functions of such a worker are mainly those of coördination, the term is not inappropriate. However, a health education specialist usually has to undertake organizing tasks. The term "community organizer," used by social workers, would seem to be particularly appropriate to one whose functions are chiefly organization functions, and organization to be effective involves coördination. But, a term such as "community health organizer" is too highfalutin a term.

Perhaps the confusion resulting in calling some one person on a health department staff *the* health educator would be largely resolved if such a person were hired as a supervisor of health education or as an administrative assistant to direct the health education activities of the staff working as a team. Certainly the division of health department activities should not be allowed to get in the way of the recognition on the part of the public that all members of a health department staff are health educators.

ALBERT R. RENWICK, DR.P.H.,
*Sanitarian, District Health Unit No. 2, West Branch, Mich.*

April 16, 1949.

# Clearing House on Public Health Salary Information and Personnel Needs

### MARYLAND SAYS ITS SAY ON SALARIES

During 1948 the Maryland State Health Department, through a special salary committee, analyzed the current salaries of county health officers and bureau chiefs of the State Department of Health. The Chairman of the Committee was A. W. Hedrich, Sc.D., Chief of the Bureau of Vital Statistics. Its report was published in mimeograph form in October, 1948, and has now been made available to the Clearing House.

The report, though less than a dozen pages in length, does far more than list current salaries and recommend higher ones. At the outset the citizenry, for whom the report is obviously intended, is reminded of the eminence of Maryland's public health. The state has had full-time health service in every county for nearly a quarter of a century.

With this appeal to state pride it then produces figures to show that a public health administrator's training costs between $25,000 and $30,000, that real incomes of public health administrators have dropped by one-fifth since 1940 while those of wage earners have increased nearly one-fifth and of physicians in private practice more than one-fourth.

Maryland public health officer salaries are also compared with those in the U. S. Public Health Service and with A.P.H.A. recommendations, in each case to the disadvantage of the Maryland physicians.

The citizens are also reminded of the heavy responsibilities carried by their public health administrators—responsibilities for administering dynamic preventive health and medical care programs. "What is ordinarily termed the preventive program has by no means reached a state of perfection," says the report.

Another example of telling the citizen what will hurt him the most is a listing of some recent results in loss of staff because of better salaries elsewhere—two physicians on $5,500 salaries leaving for other states to accept positions at $8,400 and $9,350, respectively; inability to fill certain key positions at salaries offered; emergency appropriations for increased salaries to meet offers made by other communities.

The salary recommendation for public health administrators is very simple: increase both the present minimum and maximum by something over 50 per cent.

Details of the report may be requested from A. W. Hedrich, Sc.D., Director, Bureau of Vital Statistics, 2411 N. Charles St., Baltimore 18.

### CANADA BRACKETS QUALIFICATIONS AND SALARIES

It will be remembered that the Canadian Public Health Association made a study of public health salaries in Canada in 1946. This was published in the *Canadian Journal of Public Health* in January, 1947, and reviewed briefly in the Clearing House *A.J.P.H.* 37:6:762 (June), 1947.

This report has been revised with 1948 data and published separately in March, 1949. It was endorsed by the Dominion Council of Health at its 56th Annual Meeting in March, 1949.

Salary recommendations are shown for the same 8 categories of public health personnel included in the earlier report, but for most categories there are

more grades of salaries and qualifications than in the earlier report.

The recommendations for each type of position are suggested for use "as a basis or guide to authorities in the preparation of salary classification and schedule." Salary recommendations do not include cost-of-living bonus, car, or room and board allowance.

The report reminds the reader that the 1946 report said "The recruitment and maintenance of an efficient, qualified professional or technical staff by official health agencies has become a major problem." It adds, "In the light of what has happened in the past two years . . . it should now read 'the recruitment and maintenance of staff is *the* major problem facing agencies today.'" "Public health is not competing successfully with other sources of professional income that are available in the United States and Canada."

The report is an excellent example of significant findings simply presented when the material is current. Too often such reports are worked over so long that they have lost their timeliness by the time they are published.

The report is available from the Canadian Public Health Association, 150 College St., Toronto 5, probably at a moderate charge. It is also published in the *Canad. J. Pub. Health*, April, 1949.

### SALARIES OF STATE ADMINISTRATIVE OFFICERS

*State Government* for February, 1949, has a double page spread showing annual maximum salaries of state and administrative officials in each of the 48 states as of January 15, 1949. In 7 states the health officer receives the highest salary of any administrator below the governor; in 6, he is one of two or more administrators to receive the highest salary. The highway commissioner receives the highest salary in the greatest number of instances; in 10 cases he receives the highest salary, and in 8 he is one of two or more to receive the highest salary. In Iowa, for example, he receives over a third more than the next highest officer, the attorney general, and 88 per cent more than the health officer and several other administrators. In Missouri, the highway commissioner receives 17 per cent more than his nearest competitor, the conservation commissioner, and one-third more than the health officer and a number of other administrators. In New Mexico, the highway commissioner as to salary is as important as the governor, and in Wyoming, within $20 annually of being as important. In Oklahoma, the highway commissioner receives a salary more than 50 per cent higher than the next highest paid administrator, the tax commissioner, and two-thirds more than the next highest, the commissioners of health and of welfare.

It would be interesting if to this tabulation were added an analysis of some of the factors found in the Maryland study discussed above, particularly cost of training, job turnover among the various types of administrators, and relative changes in real income.

In the same issue of *State Government* is Public Health in State Government, by John D. Porterfield, M.D., Ohio State Director of Health. He ends with these words, "Studies have demonstrated that effective public health programs can save their own economic cost many times over as well as provide for the people 'a condition of physical, mental, and social well-being and not the mere absence of disease or infirmity.'" This ought to be another fruitful line of inquiry for those who must decide the relative worth of various state administrators.

*State Government* is the monthly organ of the Council of State Governments, 1313 East 60th Street, Chicago 37—$.50 per copy, $5 annual subscription.

# Credit Lines

### THE NASHOBA ASSOCIATED BOARDS OF HEALTH

Referred to as an example of "local and individual initiative" in a recent Boston editorial, the Nashoba Associated Boards of Health has been attracting wide citizen and professional interest in Massachusetts. The Association is a local health unit, organized as a demonstration 18 years ago by the Commonwealth Fund with the hope that at the end of the 5 year trial period, some of the member towns would decide to support the project. As evidence of its success 10 towns, at the close of the experiment in 1935, voted to support the Unit team of a medical director, director of nursing, sanitarian, laboratory technician, and clerks.

The Nashoba Unit suffered with personnel shortages during the war. Nine towns, however, have kept the project going even with limited services available. Their faith is now being strengthened. In 1948, a medical director and a director of nursing were employed and the sanitarian returned from his army service. The immediate objective became that of enlarging the Unit, because it was serving a population of only 16,500, far below the desired number of 35,000. A concentrated program of public relations and health education was begun in October. The joint staffs of the Unit and the District Health Office of the Massachusetts Department of Public Health worked together and have made considerable progress toward the goal. As of July 1, 1949, 25,000 citizens in the Nashoba Valley will have the protection and services of a full-time public health team of the Nashoba Associated Boards of Health. This represents a 50 per cent gain in population served.

The essence of this demonstration has been caught in a statement made by Dr. Hugh R. Leavell, President of the Massachusetts Central Health Council who said: "We feel that this demonstration of coöperation of the towns in that area toward better living, is indeed a source of great hope for the future health of our citizens."

### PLANNING A MASS X-RAY PROGRAM

For nearly 4 months in the summer of 1947 an intensive chest x-ray campaign was being carried on in Minneapolis. A report of this campaign has now been published giving complete details of its organization, medical policies, public relations, community organization, records system, finances and results. The report is well illustrated, readable, and generally well produced. It is available from the Minneapolis Community-Wide Chest X-Ray Survey, 240 South Fourth Street, Minneapolis.

### SPECIAL PROBLEMS OF CHILDREN

The second edition of this valuable publication, *Some Special Problems of Children, Aged 2 to 5 Years* has appeared under the auspices of the National Mental Health Foundation, Inc., Philadelphia, in association with the New York Committee on Mental Hygiene, State Charities Aid Association. This pamphlet was planned by Nina Ridenour, Ph.D., now on the staff of the National Committee for Mental Hygiene. The foreword by Robert H. Felix, M.D., of the U. S. Public Health Service and now Chief of the new Institute on Mental Hygiene, commends this pamphlet to parents and to all others who work with children "because it is a most helpful guide in

assisting us to understand and to deal with vital and everyday problems of normal children."

This pamphlet includes such problems as When a child hurts other children, When he is destructive, When he uses bad language, When he won't share, When he still sucks his thumb, When he still wets, When he masturbates, and When he has fears. This deserves a wide circulation. The sponsors can be proud of the second edition.

### ACCIDENT PREVENTION THROUGH COMICS

For some 15 years the Travelers Insurance Companies have been issuing an annual booklet on accident prevention. Its 1949 edition is called "The Human Race." Its series of accident facts and figures are interlarded with pages of satirical comics—the Galahad in the drawing room who is the roadhog on the highway, the man who buys all the car gadgets ever heard of, but does nothing about defective brakes, etc., etc. Unlimited permission to reproduce and free copies are available from Travelers Insurance Companies, Hartford, Conn.

### MEDICINE, LAW, AND THE FAMILY

The New York Academy of Medicine and the New York County Lawyers' Association recently coöperated in an unusual Conference on Law, Medicine and the Unstable Family. The three sessions dealt respectively with the facts of family instability, its multiple causes, and the ways in which the family can be rendered more stable.

Representatives were drawn not only from the two professions, but from sociology, education, vital statistics, family consultation, family courts and psychiatry as well. The transactions of the Conference will be published and should be requested, if desired, from the New York Academy of Medicine, 2 East 103rd St., New York 29.

### SURVEY NEARLY HALF A CENTURY OLD

On April 3, the *Survey Magazine* (112 East 19 St., New York) celebrated its 40th year. Its editor, Paul Kellogg, has been associated with it since the beginning, and editor for all but the first three years. Actually the *Survey* has a longer history having existed under various names back to the 80's. The April memorial issue has articles by Howard Rusk, M.D., and Justice W. O. Douglas among others. Its lead article is, "The Key to Economic Development" by Dr. J. B. Condliffe, University of California.

The *Journal* joins with many other well wishers in greeting an elder brother in the field of public health and welfare on his last lap toward the half century mark.

### A WEST VIRGINIA FIRST

West Virginia in March opened its first rheumatic fever diagnostic clinic—the 26th state to do so. Located in the Marion County Health Center at Fairmont, this is a coöperative effort among the county health department, the county medical society and Fairmont General Hospital. The county health officer, A. Glenn Evans, M.D., and two members of the medical society share in the administration of the clinic; the medical society designates members to serve in the clinic for a two month period at a time, and the hospital accepts children who need hospitalization.

Children are accepted on referral from the family physician. A diagnosis with recommendations, based on physical examination, chest fluoroscopy and x-ray, urinalysis, blood count, blood sedimentation test, and electrocardiogram, is sent to the family physician.

### DISCRIMINATION LESSONS STEP BY STEP

A recent resolution of the Missouri Medical Association by deleting the word "white" from its Constitution,

throws its membership open to Negro physicians. All physicians from component county medical societies are now eligible. The resolution, introduced by Park White, M.D., pediatrician of St. Louis, was passed by a vote of 60 to 16.

### THE INCENTIVE OF SELF INTEREST

Pulling the heart strings is perhaps the standard method of getting money from the public for worthy causes. But the New York University-Bellevue Medical Center of New York takes another tack in its current campaign to raise more than 32 million dollars needed to complete the center.

In the March issue of its bulletin, *The Medical Advance,* it asks New York industry for at least 1½ million dollars. Its argument is a chart showing a loss of nearly 500 million dollars to New York business firms and their employees from sick absenteeism, 40 million dollars lost by 3½ million workers because of colds, a third of a 500 sample of business executives examined found with health deficiencies. This is what industry could give money for: construction and equipment of the Institute of Industrial Medicine, construction of laboratories for the study of effects on workers of chemical compounds, provision of facilities for the Laboratory of Industrial Hygiene, construction of shops for training of disabled.

Anthony J. Lanza, M.D., is chairman of the Medical Center's Institute of Medicine.

### A NEW NOTE ON HEALTH INSURANCE

Perhaps the Health Insurance Plan of Greater New York is the largest of the current voluntary medical care plans now operating in the United States. Originally fathered by Mayor La Guardia, it is now in its 3rd year of operation. Basic to its methods is group practice. The contribution that its experience may have to the present discussions of voluntary versus compulsory medical care insurance is dealt with by two separate writers in the *Sunday Magazine* sections of the two leading New York City morning newspapers. In the *New York Times* of March 6 appears "The Health Issue: A Middle Course," by David Heyman, President of the Health Insurance Plan. Its thesis is: voluntary insurance for all medical care plus group practice by doctors suggested as bases for a nationwide program.

A week later, Lewis K. Hill, staff writer, wrote, "Who Will Pay the Doctor?" for *This Week* of the *New York Herald Tribune.* Here too is a suggestion that group practice is an indispensable element in medical care insurance, whether voluntary or compulsory.

### DR. MOENCH PROFILED

The March, 1949, *Health Officers News Digest* of the Public Health Committee Paper Cup and Container Institute, 1790 Broadway, New York 19, has a profile of G. Frederick Moench, M.D., Director of Health and Welfare at Oak Ridge, Tenn. It is a lively story of Dr. Moench as a country doctor, health officer, active PTA worker, and now engaged in setting up a civilian public health system for what used to be a closed city like a military reservation.

### IDAHO NEWS LETTER

The Idaho Public Health Association, which has been an A.P.H.A. affiliate for 10 years, has begun the publication of a monthly news letter. It is one of the few affiliates that regularly publish such a bulletin. The first issue was that of October, 1948. It has carried full news of the progress of recent health legislation in Idaho, among which is a one mill tax levy exclusively for local health purposes. The *News Letter* is available from A. W. Klotz, Secretary, Idaho Public Health Association, Box 640, Boise, Idaho, *$1 per year.*

U. S. HEALTH PICTURE REPRINTED

Anyone who has been unable to get *Guide to Health Organization in the United States,* first published by the Public Health Service in 1946, can now have it. "This panoramic view of the entire health structure of the nation" has had 1948 reprinting. Among its virtues are a bibliography and 6 appendices with a wealth of statistical information, all of it, however, still as of 1946. U. S. Gov. Ptg. Office, Washington, D. C., *20 cents.*

WORTH ACQUIRING

*Where Shall We Eat?* is a skit for use in training food handlers. In two acts, taking perhaps 15 minutes to play, it points out all the horrors that can be perpetuated by a careless waitress and, in contrast, the proper attention to sanitary service. A special pedagogic note is that the same waitress can be either the careless or the perfect one depending on her employer's attitude and the inservice training he provides. Prepared by the Cook County Department of Public Health from which it is available, 737 South Wolcott St., Chicago 12.

*Dr. Fraud Confesses* is an 8 page comic in four colors prepared for the American Cancer Society by Brevity Inc. Its first printing of 500,000 has been distributed to the 60 state and local cancer societies and is available for the public. Aimed at an adult audience, its theme is that cancer in its early stages can be cured and that the various fads and quackeries delay effective treatment and thus cause needless deaths. American Cancer Society, 47 Beaver St., New York 4.

*Helping Families Plan Food Budgets* has been prepared by the Bureau of Human Nutrition and Home Economics of the U. S. Department of Agriculture. It is designed as a guide for social workers, nutrition teachers, and others who are helping families get nutritionally adequate meals for the money they have to spend for food. "Better diets can mean better health for thousands," it says. Superintendent of Documents, Washington 25, D. C., *15 cents.*

*Food Value Charts* are 12 in number, exhibit size on heavy cardboard in pleasing maize and blue colors. These are revisions of charts first published in 1946 by the Philadelphia Child Health Society, with the coöperation of the Nutrition Division of the Pennsylvania Health Department and Philadelphia nutritionists. On the back of each chart are stated the September, 1948, revised Recommended Dietary Allowances of the Food and Nutrition Board of the National Research Council as well as facts about losses of various nutrients during cooking. Philadelphia Child Health Society, N. E. corner 7th & Delancy Streets, Philadelphia 6. Set of 12 charts, *$1.00.*

*Nutrition Teaching Aids for the Use of Professional People,* a set of food value charts, was originally prepared for public health workers in Cleveland. They have now been made available at cost for wider distribution. Each set includes 15 cards—3½" x 6½"—which illustrate by colored bars the comparative food value of milk and coffee, whole milk and skim milk, fish and meat, etc. Nutrition Association of Greater Cleveland, Room 1016, 1001 Huron Road, Cleveland 15, Ohio. Single sets are *30 cents;* quantities of 25 or more are *25 cents* a set.

# BOOKS AND REPORTS

*All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.*

**The Problem Drinker**—*By Joseph Hirsh. New York: Duell, Sloan & Pearce, Inc.*, 1949. 196 pp. Price, $3.00.

A useful book. A summary of fact and opinion without novelty of information or originality of viewpoint. This well defined and much exploited segment of the alcohol problem in contemporary U.S.A. is dealt with rationally and with good purpose. Many anxious about themselves or their friends will be wise to study all the ten chapters and use appropriately the four appendices for which they will find the index quite adequate.

We have here much honest competent fact, diluted with about the same amount of emotional resistance to the practical implications of these facts.

As the genial and facile author says "science and objectivity tilt with emotion and controversy."

While disregarding all users and misusers of beverage alcohol except the minority, the problem drinker, Mr. Hirsh accepts the statement of Jellinek that "more people drinking means, of course, more chronic alcoholics." The first three chapters give some historical background and a partial story of the essentials of alcohol's effect upon man. Chapters IV, V, and VI present the familiar picture and plea for irresponsibility, of the alcohol factor, and emphasize the frequency of prior psychic abnormality of the problem drinker.

The seventh chapter, on Alcoholics Anonymous, could not be bettered if the author had written as one A.A. Present organization and accomplishment and signs of still better progress for the future are brought right up-to-date in Chapters VIII and IX. The immediacy of need of social as well as professional progress is well stressed in the final chapter.

HAVEN EMERSON

**Public Health in the World Today**—*Edited by James Stevens Simmons; Assistant Editor, Irene M. Kinsey; Foreword by James Bryant Conant. Cambridge, Mass.: Harvard University Press*, 1949. 332 pp. Price, $5.00.

Twenty-four distinguished contributors provide timely information in this symposium devoted to community, national, and world health. President Conant emphasizes the importance of keeping people well if we are to attain the social objectives of making the new knowledge equally effective in the lives of all the people of a nation, and discusses circumstances which caused an acceleration in the march of organized society toward increased health.

Evidence is presented dramatically by the editor to indicate how unnecessary are infections and death from smallpox, besides the accompanying hysteria and expenditures of millions of dollars. The evolution, significance and professional aspects of public health, the evaluation of medical care needs, medical education, the federal civilian, and military health and medical care services, nutrition, occupational medicine, maternal and child health, new problems of the atomic era, and international problems are among the featured topics considered by leaders fully equipped for their tasks.

Congratulations and appreciation are due for this assembly of stimulating information, with the parts so well correlated, in a well printed book which every student of medicine, of public

health, and of world affairs should read. Other professional groups will find this volume an invaluable source of authoritative statements, dedicated to a new concept of service and to a new vision of the world of the future, in which man "and all his kind can live, work, and walk with the dignity of a civilized animal in full physical, mental, and moral health."

IRA V. HISCOCK

**Child Health Services and Pediatric Education.** *Report of the Committee for the Study of Child Health Services. The American Academy of Pediatrics with the Coöperation of the U. S. Public Health Service and the U. S. Children's Bureau. New York: Commonwealth Fund,* 1949. 270 pp. Price, $3.50.

This report is a volume demanding the attention and study of conscientious public health workers. It disturbs complacency by its clear, persuading facts but it is encouraging in its details of "attainable levels of performance."

The study and report owe much of their strength to the interest and participation of the practising doctors of this country. The report, published by the Commonwealth Fund, is particularly notable for its concise, brief language and superior graphic presentations. Only facts are reported; recommendations and action are the responsibility of the readers and the state committees which have been formed. The method of presenting facts alone permits their analysis without the negativism often engendered by recommendations. This will not fail to arouse the urge for action among competent public health workers, however.

Three major sources of health services, private practice, hospitals, and community services, are examined in detail. Comparisons are made state by state, by regions, and by a valuable method of county groups. The selection of the critical indices for study will arouse the interest of clinicians, administrators, and all interested in evaluation.

Public health and preventive pediatrics are extensively studied. State health officers, directors of maternal and child health programs, county health officers and their staffs will not find comfort but will be challenged by the record of services we have been able to provide rural areas.

ROSCOE P. KANDLE

**Personal and Community Health** —*By C. E. Turner. (8th ed.) St. Louis: Mosby,* 1948. 565 pp. Price, $4.00.

Good books grow, and sometimes it takes a long time for them to ripen and mature. They are the expression of experience and their development cannot be hurried. This is especially true of textbooks. *Personal and Community Health* represents the fruit of many years of teaching health to college men and women. It is not only expressive of the knowledge necessary for good health, but also an understanding of those who must set the standards of living in the modern world. The information presented is based upon sound and progressive principles. The approach is positive, based upon conviction but accompanied by a spirit of openmindedness.

The eighth edition is an extensive work covering wide areas in both personal and community hygiene. The very difficult problem of including both fields in one book is well handled. Of necessity, some subjects are discussed but briefly. Part I, with 19 chapters, deals with personal health. Twelve chapters on community health compose part II. Good references are found at the end of each chapter. Appendix A, with a wealth of material on communicable diseases, and Appendix B, with a short but helpful discussion of disinfectants, are also included. An ex-

tremely helpful glossary to the layman concludes the work.

The book is well written and the material presented in a dignified but attractive manner. There are numerous illustrations. College teachers and students of hygiene should be interested in the volume. It is a very good book.

W. R. MORRISON

**The Case of Augustus D'Esté**—*Edited by Douglas Firth. New York: Macmillan,* 1948. 58 pp. 3 illus. Price, $1.75.

This little book represents a footnote in the history of medicine. It is based on a small collection of letters, diaries, account books, and other manuscripts, kept or written between 1793 and 1847 by Lady Augusta d'Ameland, wife of Prince Augustus Frederick, sixth son of George III of England, and their son Sir Augustus D'Esté. In 1940, when waste paper was being collected for conversion into pulp, these papers came to light. Much of the material had fallen prey to the gnawing criticism of rats, but what survived is of considerable interest. It contains what may be the first clinical description of disseminated sclerosis, and written by the patient. The manuscript is now in the possession of the Royal College of Physicians, London, and is reproduced by their permission. For half his life Augustus D'Esté was a victim of disseminated sclerosis, and he wrote a vivid account of it. He began to note his symptoms in 1830 and stopped in 1844. It is a record of personal experiences which could not have been suggested by any medical book, as the disease was not adequately described until twenty years after D'Esté's death in 1848. This small volume which can easily be read in one hour is recommended to all who are interested in disease from the patient's point of view and to those interested particularly in disseminated sclerosis.

GEORGE ROSEN

**Proceedings of the Fourth International Congresses on Tropical Medicine and Malaria, May 10–18, 1948, Washington, D. C.** *Washington: Dept. of State. U. S. Gov Ptg. Office,* 1948. 946 pp.

This volume, which has been prepared and edited by the Secretariat of the Congresses, and in collaboration with the Division of International Congresses of the U. S. Department of State, goes back to the consistent work over the years of Wilbur A. Sawyer, M.D., Secretary General, and his able associates. As Dr. Scheele, the President of the Congresses, points out in the foreword, the proceedings indicate the breadth of the program and the diversity of its subjects. There were also the intangible but nonetheless substantial values provided by the Congresses, such as the spirit of fellowship and good will which pervaded all of the activities.

The scientific work of the Congresses was divided up into sections on research and teaching institutes, on tropical climatology and physiology, on bacterial and spirochetal diseases, on virus and rickettsial diseases, and on malaria. In addition, there are reports on the official sessions and the special exercises in commemoration of the demonstration by Walter Reed of the mosquito transmission of yellow fever, as well as commemoration of the 50th anniversary of the discovery by Ronald Ross of the method of transmission of malaria.

The U. S. Department of State and the United States Government Printing Office have set through this volume a high standard for similar publications of the future.

REGINALD M. ATWATER

**How to Live Longer**—*By Justus J. Schifferes. New York: Dutton,* 1949. 255 pp. Price, $3.00.

This book, written in an easy-to-read style, brings together materials

giving the present status of "eleven killers of Americans: 1949." The assumption is made that a better informed public can reduce mortality rates in cardiovascular-renal diseases, cancer, accidents, tuberculosis, pneumonia, syphilis, diabetes, premature births, and suicides to the extent of 250,000 lives saved each year. The author presents statistics on trends and information as to what is now known about each "killer," including symptoms to look for, treatment, and advice as to what to do.

Although few statistical tables appear, the body of the book is given over to figures of one kind or another supporting the thesis that lives can be saved.

The advice given in each chapter falls into three major categories: (1) recognize symptoms, (2) call the physician in emergencies, for periodical examinations, and when the "little danger signals flash," and (3) assume responsibility as a citizen to see that community diagnostic and treatment facilities are available.

The chapter on "Suicide — The Ghost," is the least effective. The brief discussion of motives for suicide based on Dr. Karl Menninger's *Man Against Himself,* is so condensed that it is questionable if the reader uninitiated into psychiatric concepts can get much out of it. In the light of the complexities of the bases for suicide, one wonders if the reader will be able to function better in a "preventive" program in this area.

This reviewer does not believe with the author that "this book will hope to bring a new focus on the 'health of the nation' with greater emphasis on health education as against medical economics." In practically every instance, the author shows the need for diagnostic and treatment facilities if the education of the individual is to bear fruit in action. A combination of health education *and* medical economics is indicated.

DOROTHY B. NYSWANDER

**Tests and Measurements Applied to Nursing Education** — *By Hyman Krakower. New York: Putnam,* 1949. 179 pp. Price, $3.50.

Administrators, supervisors, and teachers in all fields of nursing are becoming increasingly aware of new methods of testing and measuring accomplishments, whether the accomplishments concern students' scores in classwork, relative time and costs of nursing services, or the ranking of candidates for appointive positions.

The title "Tests and Measurements Applied to Nursing Education" suggests that nurses will find useful material applicable to their problems in testing students and staff members, and the first 85 pages of this book fulfil this hope to some extent. The author covers the first steps in tabulating, classifying, and determining modes, means, medians, and percentile ranks of scores. On proceeding to more advanced calculations, however, the author's presentation becomes confused. It lacks: (1) clarity, because the basic principles are not known to nurses and are not explained, the sentence structure is frequently ambiguous and the thought underlying the statements is not clear. (For example: the first sentence of the new section explaining Binomial Expansion (page 86) reads: "Where there is one factor involved, it may take one of two forms, i.e., either happening or not happening."); (2) accuracy, because the writer tries to cover too much ground in too little space; and (3) applicability, because the purpose of the calculations is not clearly defined and the nurse is not shown how to use the results after the calculations are made.

In the main the subject matter on pages 87–138 is too advanced for those

nurses who have not had special preparation in tests and measurements, or who are not natural-born mathematicians and statisticians. Few nurses in any case would perform the calculations given in these chapters in their daily work, for example, positive and negative skewness.

Chapter X attempts to cover the subject of test construction in ten pages. This is one of the much needed techniques among teachers, but is so superficially dealt with here as to be dangerous. There is far more to test construction than a mere listing of the various forms of objective questions. (Incidentally, true-false questions are presented without any mention of the fact that this form of question is discredited for professional tests and has been discontinued by the best test technicians.) The author fails to give instructions that would aid in writing discriminating multiple-choice questions to sample knowledge and judgment and leaves out the usual warnings against the pitfalls in writing the distractors or wrong choices.

"Reliability" and "validity"—two really essential definitions in a nurse's understanding of testing—are disposed of in a few brief sentences without illustration.

There are simpler and more accurate texts for nurses who wish to become familiar with the elementary techniques of this subject. If more advanced procedures are needed, the best advice is to seek the aid of a test technician and not attempt these skilled procedures—certainly not after a mere reading of a series of mathematical steps.

DOROTHY DEMING

**Odors, Physiology and Control**—*By Carey P. McCord and William N. Witheridge. New York: McGraw-Hill,* 1949. 405 pp. Price, $6.50.

The recent focusing of national attention on the health and safety, as well as esthetic and economic, implications of air pollution makes this volume on the physiology and control of odors particularly timely and valuable.

This is the first time that the subject has been treated in one volume and in such an extensive manner. The index itself is particularly orderly and well developed and enables quick referral to the wealth of material presented in the 23 chapters. Beginning with the chapter on the olfactory system and describing the physiology involving chemical constitution, the book includes a detailed classification of odors and a thorough discussion of the many practices involved in the control of odors. The latter part of the book contains some very informative data on the making of an odor survey and the legal aspects of odor nuisances. The authors have also prepared a very extensive bibliography of 125 pages, grouped into a classification similar to the one employed in introducing the subject matter in the volume itself.

This volume is unique in many respects. The manner in which the data are presented not only makes it easy for the reader to understand a rather technical subject, but also adds interest. Many illustrations have been utilized, and the historical development of the problem has been traced by drawing considerably on ancient documents.

This book should be a very useful tool not only to industrial hygienists and other public health workers, but also to architects, housing authorities, city planners, and the legal profession.

J. J. BLOOMFIELD

**Psychiatry for the Millions**—*By Benzion Liber, M.D. New York: Frederick Fell,* 1949. 297 pp. Price, $2.95.

In this addition to the rapidly growing library of psychiatric literature for the layman, Dr. Liber favors the common sense, practical interpretation of

mental illness and its treatment. The layman will appreciate the rather down-to-earth descriptions of personality disorders and will undoubtedly find some fascination in the many case reports that are included to illustrate the various deviations from the normal. Because of a tendency to oversimplify, however, cause and effect are so often taken for granted that the reader is apt to draw unwarranted conclusions as to the fundamental and precipitating causes of mental disease. Moreover, in many instances, the impression is left that in some of the seemingly deep-seated and pervasive emotional disturbances described, a few conversations with the psychiatrist were sufficient to yield a cure. The author would not have prejudiced the case for psychotherapy had he sacrificed some of the illustrative cases for a fuller description of the dynamics of psychiatric disorders. Moreover, had he done this, the book would be more readable, since there is a tendency to repetitiveness resulting from the inclusion of so many clinical examples.

The subject matter covers a wide range of topics and includes chapters on bringing up the child, juvenile delinquency, psychosomatic medicine, sex and marital problems, alcoholism, and on war and post-war mental health. Descriptions of various types and degrees of psychoneuroses and psychoses are included and briefly discussed. The final chapter is devoted to prevention and treatment.

In this last chapter the public health worker and physician will be grateful for the frank and forthright manner with which the author discusses the current popularization of psychiatry in novels, plays, and the moving pictures, the uses and abuses of psychoanalysis, and the dangers of quackery. Greater emphasis should have been placed in this last chapter upon the need for more professional personnel, and for more facilities capable of providing programs of mental hygiene, child guidance, and research as important measures for the prevention of mental illness. Perhaps the weakest aspect of this last chapter is the section in which general recommendations for achieving mental health are offered. These recommendations consist, on the whole, of a series of "do's and don'ts" that for the modern individual are easier to read than to practise. These recommendations essentially counsel a clean healthy life and include rather dogmatic statements about the evils of constipation and of cigarette smoking for which clinical proof is as yet lacking.

This book has greater interest for the layman than for the professional worker, and its chief value resides in its avoidance of mumbo-jumbo and in the assurance that it will give to many individuals the concept that emotional instability can be treated and controlled. HENRY B. MAKOVER

**Premature Infants** — *By Ethel C. Dunham. Washington, D. C.: Supt. of Documents,* 1948, *Children's Bureau Publication No. 325.* 401 pp. Price, $1.25.

The fact that textbooks on this extremely important subject are few in number makes this addition to medical literature particularly welcome.

The contents of the manual are divided into two main parts: general considerations and clinical considerations.

Part I deals with the definition, diagnosis and incidence of prematurity, and the physical growth and development of premature infants. The causes and prevention of premature birth are discussed and attention is drawn to the high mortality of the premature infant. Part II covers the general care and management of premature infants, especially in relation to their physiologic handicaps and nutritional requirements. It includes sections on congenital mal-

formations, birth injury, infection, abnormal blood conditions and metabolic and nutritional disturbances.

In addition to 31 illustrations, this manual contains many tables. The subject matter is well written and attractively set out. Each section is summarized, and a good index is provided.

This is the most comprehensive work yet published on the subject. Although it gives too much detail for the average student doctor or nurse, it certainly will be agreed that no physician or nurse undertaking the care of premature infants can afford either to omit reading this manual or to omit keeping the copy constantly available for reference.

A great deal is expected from an author so experienced in her subject as Dr. Ethel C. Dunham, and this manual should meet the highest expectations.

V. MARY CROSSE

**Bacterial and Mycotic Infections of Man**—*Edited by René J. Dubos. Philadelphia: Lippincott,* 1948. 785 pp. Price, $5.00.

This book is the fraternal twin of *Viral and Rickettsial Infections of Man* by Rivers, et al. The editorship of Réne Dubos, another distinguished member of the Rockefeller Institute, assembles the specialized knowledge and viewpoints of 33 outstanding colleagues in research groups of the United States and Canada. The two books are very valuable in making available to clinicians and public health workers current discoveries in research. The pair are identical in handsome appearance, in freedom from typographical errors, and under the sponsorship of the National Foundation for Infantile Paralysis, in availiability at extraordinarily low cost.

In keeping with the perspective of the editor, emphasis is on host-parasite relationship rather than the microörganism. The first quarter of the book is preparatory background. After Dubos and Pappenheimer discuss morphology and physiology of bacteria, Francis reviews parasitism and disease, MacLeod and Pappenheimer consider the role of the bacteria, and Francis the response of the host. Chase focuses on the interplay of host and parasite in the allergic state and Treffers in their immunological and immunochemical manifestations.

In the body of the book the specific microörganisms are described under the general headings of introduction (definition), history, morphology, cultural characteristics including nutrition and metabolism, resistance, variation, distribution and range of pathogenicity, pathogenesis, immunity, diagnosis, treatment, epidemiology and control. As a sample of famous authorities may be cited Mueller (Corynebacteria), MacLeod (Pneumococci), Nungester (Anthrax Bacillus), Meyer (Pasteurella), Conant (fungi). The concluding section contains a valuable discussion of principles of chemotherapy by Davis, a masterly condensation of the principles of epidemiology by Maxcy, and a practical consideration of identifying pathogenic bacteria by Murray and Kalz.

The material is not presented as pap. The authors strive to write in terms which all can follow, but some phases of metabolism and immunochemistry defy translation into terms with which most of us can cope. While neither conceived nor appropriate primarily as a textbook in medical bacteriology, some of the treatises are more exhaustive than those in current texts, but a few presentations tend to be cursory. Certainly study of the book will reward neophytes and veterans both of clinical medicine and of public health.

CHARLES EDWARD SMTIH

**The Hospital in Contemporary Life**—*By Nathaniel W. Faxon, M.D. Cambridge, Mass.: Harvard University Press,* 1949. 288 pp. Price, $5.00.

Eight doctors of medicine, specialists

in different fields including an outstanding hospital director, contribute discussions in this volume on the relationship of the individual to the hospital and of the hospital to society. Much material in the book represents a digest of the literature, and credit is given to the report of the Commission on Hospital Care.

The literary style is effective, and the information presented affords an opportunity to acquire an understanding of the hospital, especially for hospital trustees, members of auxiliaries, and other non-professional hospital groups, as well as serving as a useful reference volume for students of public health, education, and social service. Perhaps a little extravagant are the publisher's note as "the most thorough-going and thought-provoking discussion . . ." and one of the author's statements concerning social forces to the effect that—"This led to the *eradication* of hospital infections. . . ."

It is gratifying to observe increasing team-play between hospitals and other official and voluntary health agencies toward a common goal of increased health, productivity, and mutual understanding. IRA V. HISCOCK

**Veterans Administration Technical Bulletins. Series 10. Vol. II.**—*Washington, D. C.: Veterans Administration,* 1949.

This is the second volume of a series of articles which the Veterans Administration has published and is distributing to its medical staff. The purpose is frankly educational. Brief summary articles covering a number of subjects "have the advantage of permitting more general presentation than is allowed by most journals and of providing more rapid publication than is possible in textbooks."

This volume contains a dozen articles on such subjects as "Rocky Mountain Spotted Fever," by Norman H. Topping, M.D.; "The Management of Vivax Malaria in the Veteran," by Harry Most, M.D.; "Late Residuals of Primary Coccidioidomycosis," by George C. Owen, M.D., and "Electric Shock Therapy" and "Insulin Shock Therapy" by competent authors.

Dr. Paul B. Magnuson, Chief Medical Director of the V.A., and the Administration are to be congratulated on the articles themselves, but more importantly on this type of review which must have a vital influence on medical personnel employed by the V.A.

REGINALD M. ATWATER

**Microbes Militant**—*By Frederick Eberson (a revision of "The Microbe's Challenge"). New York: Ronald Press,* 1948. 401 pp. Price, $4.50.

The subtitle of this book, "The Story of Modern Preventive Medicine and Control of Infectious Diseases," most adequately describes the content and should arouse the interest of the public health worker. However, when one glances over the chapter and section titles, the first reaction is one of aversion which is immediately replaced by the assumption that the book is written for purely lay readers. This is an entirely erroneous concept.

Dr. Eberson admirably and simply carries the reader through the fundamental discoveries into the more complex problems of microörganisms, such as variation and mutation, modern concepts of immunity, some of the important chemical and physiological aspects, the action of the antibiotics, the bacteriophages, and finally a discussion of a few of the major challenging problems of preventive medicine.

The book, one in the Humanizing Science Series, is written in a most interesting prose style with sufficient humor and dramatic presentation to be entertaining and relaxing. The author has attempted to solve, explain or interpret some of the baffling problems

of preventive medicine as they pertain to microbiology in the light of modern research. In some instances this has been accomplished with astounding simplicity and clarity, in other instances, present available evidence would lead some to disagree rather violently with a few of the author's interpretations.

The book cannot be recommended as an authoritative text, for which it was obviously not intended, but can be recommended for entertaining reading for all public health personnel, and would be particularly valuable for practising physicians who wish an easy review of some of the important recent developments in the field of microbiology. LEE POWERS

**A Textbook of Entomology**—*By Herbert H. Ross. New York: Wiley,* 1948. 532 pp. 434 fig. Price, $6.00.

Professor Ross, in this new *Textbook of Entomology,* has succeeded admirably in his purpose to present "under one cover the fundamental aspects of entomology, organized so as to give students a general idea of the entire field," and to serve the need of the seeker for background information as well as that of the budding specialist. This he has done by emphasizing basic principles throughout and including enough pertinent detail to demonstrate those principles without burying them. His examples and illustrations are well selected, and his exposition so organized, balanced, and integrated that the whole is satisfyingly adequate. This compact and beautifully illustrated volume offers a readable, broadly conceived, and sound scientific introduction to the complexities and wonders of insect life.

The ten chapters deal with the history of entomology and its outstanding early personalities (25 pages); the classes and subclasses of Arthropoda (32 pages); external anatomy (42 pages); internal anatomy (19 pages); physiology (53 pages); the life cycle (including embryology and seasonal cycles, 47 pages); the orders of insects (with keys and references to the common families of the larger groups, 206 pages); the geological history of insects (21 pages); ecological considerations (37 pages); and control considerations (33 pages). Economic species are abundantly included as examples but are not treated individually; injury and control are simply summarized as to types and principles. Recent developments, like DDT and the use of electron microscopy, are appropriately noted. It is the only general textbook of entomology extant that adequately presents modern concepts of physiology, comparative morphology, and ecology, without at the same time slighting taxonomy.

The unavoidably arbitrary selection of material and viewpoints inherent in a simple and concise presentation of this kind has been tempered by the mature judgment born of the author's years of experience as teacher and investigator. The writing is lucid and a model of straightforward and orderly style. Minor inconsistencies and factual or typographical errors and omissions are so few as to be inconsequential in a work of such scope and merit. The format of the book is pleasingly neat, the type easily read, the figures clearly printed, the binding serviceable, and the index not exhaustive but adequate.

The book is of interest to public health workers not as a laboratory manual, but as a source of background information on arthropods in general. It can be highly recommended as an excellent entomological guidebook.

ALBERT MILLER

**Physical Examination of Selective Service Registrants**—*Special Monograph No. 15. Selective Service System 1947. 3 vols. Washington, D. C.: Gov. Ptg. Office,* 1948. Price, Volume I, $1.25; Volumes II and III, $1.00 each.

This is one of a series of 18 invalu-

able monographs describing the operation of the Selective Service System. As indicated by the title, this monograph deals with the medical aspects of the system. Volume I contains 16 chapters describing the origin and operation of the medical organization of Selective Service, not only in World War II, but also previous wars, with 3 chapters devoted to World War I experience, and 2 to peacetime planning and operations. The balance of the text is devoted to the second World War, special chapters dealing with medical functions, classifications, examination procedures, bases for selection, standards, analysis procedures, and administrative relationships.

The text is supplemented by 6 appendices which comprise part of Volume I and all of Volumes II and III. These appendices set forth in detail the physical standards for selection, the administrative regulations for medical examinations, the forms used and instructions for their use, and finally an entire volume of 56 tables summarizing the results of the physical examinations. These tables are broken down by regions, by states, by age and color of registrants, and by periods of time over which the system was operative. There is no breakdown by counties, this being kept for a separate series of volumes.

These volumes constitute a veritable gold mine of highly valuable information, not only on the results of the physical examinations under Selective Service, but also upon the operation of the program. Of particular interest is a brief analytical chapter entitled Lessons from Experience. The narrative portions of these volumes constitute an important record of an essential and much unappreciated part of the war record; the statistical tables will serve for a long time as one of our most valuable records of the physical status of an important segment of our nation. The Selective Service is to be commended on the prompt and careful presentation of this material in such highly usable form.

GAYLORD W. ANDERSON

**Statistical Abstract of the United States, 1948 (69th ed.)**—*Compiled under the Supervision of Morris H. Hansen. Washington, D. C.: Supt. of Documents, Govt. Ptg. Office,* 1948. 1,054 pp. Price, $2.75.

This is one of the books which public health statisticians should keep within handy reach. This volume, published annually, contains the most important statistics on the industrial, social, political, and economic organization of the United States.

Because the book covers such a vast scope, the data are largely restricted to those for the nation as a whole and to some extent for states and large cities. Although information is not shown in this volume for minor civil divisions, it can readily be obtained from the sources given at the foot of each table.

This book of 1,054 pages has two purposes: (1) To serve as a convenient reference volume for quantitative summary information; (2) To serve as a guide to important sources of more detailed data. Just a glance at the titles of the 32 chapters conveys some idea of the scope of the publication.

In this 69th edition certain new subject material is presented on population forecasts; employment in the executive branch of the federal government; consumer income; current industrial production; and several other subjects.

One of the most important features of the book is the bibliography of sources of statistical data which appears at the end of the volume.

MARY DEMPSEY

# BOOKS RECEIVED

*Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.*

ALCOHOL AND HUMAN AFFAIRS. Willard B. Spalding and John R. Montague. New York: World Book, 1949. 248 pp. Price, $1.64.

CHILD HEALTH SERVICES AND PEDIATRIC EDUCATION. Report of the Committee for the Study of Child Health Services. The American Academy of Pediatrics with the Coöperation of the U. S. Public Health Service and the U. S. Children's Bureau. New York: Commonwealth Fund, 1949. 270 pp. Price, $3.50.

DIAGNOSIS OF VIRAL AND RICKETTSIAL INFECTIONS. Frank L. Horsfall, Jr., Editor. New York: Columbia University Press, 1949. 153 pp. Price, $3.75.

EPIDEMIOLOGY OF HEMOLYTIC STREPTOCOCCUS, THE. Alvin F. Coburn and Donald C. Young. Baltimore: Williams & Wilkins, 1949. 216 pp. Price, $4.00.

EVALUATION OF CHEMOTHERAPEUTIC AGENTS. Colin M. MacLeod, Editor. Symposium held at the New York Academy of Medicine March 25 and 26, 1948. New York: Columbia University Press, 1949. 205 pp. Price, $4.00.

FOOD POISONING. G. M. Dack (rev. ed.). Chicago: University of Chicago Press, 1949. 170 pp. Price, $3.75.

FOR EFFECTIVE NEUTRALIZATION OF INDUSTRIAL WASTES. Philadelphia: Leeds & Northrup, 1949. 19 pp.

FUNDAMENTALS OF PULMONARY TUBERCULOSIS AND ITS COMPLICATIONS. Sponsored by the American College of Chest Physicians. Springfield, Ill.: Thomas, 1949. 470 pp. 182 illus. Price, $9.50.

GOVERNMENT OF CITIES IN THE UNITED STATES. Harold Zink (rev. ed.). New York: Macmillan, 1948. 605 pp. Price, $5.00.

GUIDING HUMAN MISFITS. Alexander Adler. New York: Philosophical Library, 1948. 112 pp. Price, $2.75.

HEALTH FILM PROGRAM FOR AMERICA, A. New York: The World Today, 1949. 28 pp. Price, $1.00.

JÁNOS, THE STORY OF A DOCTOR. John Plesch. New York: A. A. Wyn, 1949. 561 pp. Price, $5.00.

JOSEPH BOLIVAR DELEE. CRUSADING OBSTETRICIAN. Morris Fishbein with Sol Theron DeLee. New York: Dutton, 1949. 297 pp. Price, $5.00.

MANUAL OF THE INTERNATIONAL STATISTICAL CLASSIFICATION OF DISEASES, INJURIES, AND CAUSES OF DEATH. Volume I. (Sixth Revision of the International Lists of Diseases and Causes of Death.) Adopted 1948. New York: World Health Organization. 376 pp.

MEDICAL MICROBIOLOGY FOR NURSES. Erwin Neter. Philadelphia: Davis, 1949. 441 pp. Price, $4.00.

NUTRITION AND THE SOIL. Dr. Lionel Picton. New York: Devin-Adair, 1949. 359 pp. Price, $4.00.

ORGANIZATION AND ADMINISTRATION OF INTRAMURAL SPORTS. Louis E. Means. St. Louis: Mosby, 1949. 403 pp. Price, $5.75.

PRESENT CONCEPTS OF REHABILITATION OF TUBERCULOSIS. Norvin C. Kiefer. New York: National Tuberculosis Association, 1948. 354 pp. Price, $3.50.

PRINCIPLES OF HEALTH EDUCATION APPLIED. Clifford Lee Brownell. New York: McGraw-Hill, 1949. 354 pp. Price, $3.75.

PUBLIC RELATIONS COMMITTEE, THE. Why and How It Works. David M. Church. New York: National Publicity Council, 1949. 27 pp. Price, $1.00.

PSYCHOLOGY OF EVERYDAY LIFE. James Drever (11th ed.). Pacoima, Calif.: Sherwood Press, 1948. Price, $3.00.

RETHINKING URBAN REDEVELOPMENT. Coleman Woodbury and Frederick A. Tutheim. Chicago: Public Administration Service, 1949. 26 pp. Price, $1.00.

SOME COMMON PSYCHOSOMATIC MANIFESTATIONS. J. Barrie Murray. New York: Oxford University Press, 1949. 96 pp. Price, $2.50.

SOME SPECIAL PROBLEMS OF CHILDREN AGED 2 TO 5 YEARS. Nina Ridenour and Isabel Johnson (2nd ed.). Philadelphia: National Mental Health Foundation, 1949. 72 pp. Price, $.25.

STATE CHILD-LABOR STANDARDS. Lucy Manning and Norene Diamond. U. S. Dept. of Labor, Bureau of Labor Standards, Bulletin No. 98. Washington: U. S. Govt. Ptg. Office, 1949. 182 pp.

SYPHILIS: ITS COURSE AND MANAGEMENT.

Evan W. Thomas. New York: Macmilian, 1949. Price, $3.00.

TEACHING POSTURE AND BODY MECHANICS. Ellen D. Kelly. New York: Barnes, 1949. 178 pp. Price, $3.75.

TEMPERATURE AND HUMAN LIFE. C.-E. A. Winslow and L. P. Herrington. Princeton, N. J.: Princeton University Press, 1949. 259 pp. Price, $3.50.

THANK GOD FOR MY HEART ATTACK. Charles Yale Harrison. New York: Henry Holt, 1949. 144 pp. Price, $2.50.

TRACE ELEMENTS IN FOOD. G. W. Monier-Williams. New York: Wiley, 1949. 490 pp. Price, $6.00.

USES OF PENICILLIN AND STREPTOMYCIN, THE. Chester Scott Keefer. Lawrence, Kan.: University of Kansas Press, 1949. Price, $2.00.

VETERANS ADMINISTRATION TECHNICAL BULLETINS. Series 10. 1946–1947. Washington: Veterans Administration, 1948.

## REPORTS RECEIVED

ANNUAL REPORT OF THE DIRECTOR-GENERAL OF THE WORLD HEALTH ASSEMBLY AND TO THE UNITED NATIONS. 1948. Geneva: World Health Organization, 1949. 47 pp. Price, $.25.

CENTRAL AND NORTH FILTRATION PLANT—PROPOSED SITES. A Report to the Subcommittee on Pumping Stations and Filtration Plants of the City Council Committee on Finance. Chicago: Chicago Plan Commission, 1949. 17 pp.

CENTRAL COUNCIL FOR HEALTH EDUCATION. Annual Report 1947–1948. London: Tavistock House. 24 pp.

ENGINEERS' COUNCIL FOR PROFESSIONAL DEVELOPMENT. 16th Annual Report, 1948. New York: Engineers' Council for Professional Development. 40 pp.

GOODWILL INDUSTRIES OF AMERICA. Serving the Nation's Handicapped. Annual Report 1948. Milwaukee, Wis.: Goodwill Industries of America.

HEALTH IN WISCONSIN. Madison, Wis.: Wisconsin State Board of Health. 63 pp

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LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE. Report on the Work of the School 1947–1948. London: University of London. 138 pp.

MONTREAL, CANADA. Report of the Department of Health 1947. Montreal: City Health Dept. 243 pp.

NEW BRUNSWICK, CANADA. 31st Annual Report of the Chief Medical Officer to the Minister of Health and Social Services, 1948. New Brunswick: Dept. of Health and Social Services, 1949. 169 pp.

NEW MEXICO HEALTH OFFICER. Annual Report 1946. Santa Fe: State Department of Public Health, 1948.

RECOMMENDED QUALIFICATION REQUIREMENTS AND MINIMUM SALARIES FOR PUBLIC HEALTH PERSONNEL IN CANADA. Toronto: Canadian Public Health Assn., 1949. 32 pp.

SCHOOL OF TROPICAL MEDICINE OF THE UNIVERSITY OF PUERTO RICO, THE. Report of the Director, 1947. New York: Columbia University Press. 107 pp.

TEN YEARS OF FEDERAL GRANTS-IN-AID FOR PUBLIC HEALTH 1936–1946. Joseph W. Mountin, Emily K. Hankle, and Georgie B. Druzina. Washington: Supt. of Documents. 77 pp. Price, $.25.

TEXAS CITY EXPLOSION. April 16, 1947. Washington: The American National Red Cross. 43 pp.

WHY DO PATIENTS IN TUBERCULOSIS HOSPITALS LEAVE AGAINST MEDICAL ADVICE? A Study by Godias J. Drolet and Donald E. Porter. New York: New York Tuberculosis and Health Assn., 1949. 66 pp.

# A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

**Most Important Cause of Death**—Epidemiologic research into accident causes, and adopting remedial measures against accidents are public health responsibilities. The basis for this broad assertion will be found in these six solid papers. Read them all.

ARMSTRONG, D. B., *et al.* Accident Prevention. Pub. Health Rep. 64, 12:355 (Mar. 25), 1949.

**From a World-Wide Viewpoint**—Causes of disease are not solely physical or biological: they are sociological too.

Though modern, scientific medicine is 150 years old, it is only in the last fifty that this conception has begun to get a foothold. You'll like this excellent presentation of the idea.

CHISHOLM, B. Social Medicine. Scient. American 180, 4:11 (Apr.), 1949.

**Fine Record**—Twenty years of medical participation in Detroit's health plan find the department and the local profession viewing the results with pride. Children are immunized against diphtheria and smallpox. Two of every three have their before-school-entrance physical examinations made by a family physician.

DOUGLAS, B. H. The Private Physician and Preventive Medicine. J.A.M.A. 139, 15:977 (Apr. 9), 1949.

**After One Hundred Years**—Without local health services, waste of voluntary and professional effort is inevitable. The writer urges physicians to contribute time and interest to health services and learn by sharing in the problems of the officers of government.

EMERSON, H. Medicine, An Instrument of Social Progress. Michigan Alumnus Quart. Rev. LV, 16:128 (Mar. 12), 1949.

**Seems Reasonable** — Obstetricians, pediatricians, and public health nurses all have priceless opportunities to add to the health and happiness of parents and children. They'd do better if they worked as a professional team, says this writer who comments, "It would be nice if they could know each other"—and helpful too.

FOX, E. G. Teamwork for the Young Child. Pub. Health Nurs. 41, 4:187 (Apr.), 1949.

**Fool's Paradise?**—Are you one who thinks that only in Russia could a politico-scientist, a Lysenko, lay down a party-line for research? It could happen here, warns this writer, in his presidential address. If you ever look up from your own particular chore, you will want to do so now—to see what's bothering this fellow who wants to keep American science free to muddle through to great ends.

GOLDSCHMIDT, R. B. Research and Politics. Science. 109, 2827:219 (Mar. 4), 1949.

**Industrial Health Is Public Health**—If the last three papers fulfil the promise of the first four, this symposium on industrial health hazards and their prevention or control should prove a valuable addition to your clipping library.

GREENBURG, L. Diagnosis and Treatment of Occupational Metal Poisoning (and six related papers). J.A.M.A. 139, 13 (and 14):815 (Mar. 26), 1949.

**Watching Twins Grow Old**—Health workers on the shady side of—oh, let's say—fifty will find a sort of morbid contentment in the results of this study. I love this final conclusion, ". . . old age is . . . as relative in its meanings and connotations as is the faculty of being alive or the quality of being human."

KALLMANN, F. J. and SANDER, G. Twin Studies on Ageing and Longevity. J. Hered. 39, 12:349 (Dec.), 1948.

**Fewer Tuberculosis Deaths, But**—Mortality rates have declined more slowly in older age groups than in the younger, and the population as a whole is aging. In 1947 more than half the deaths were in people past "the vulnerable age," 15–45. This combination of statistics should give you something to ruminate over.

LEWIS, S. A. Tuberculosis Mortality in the United States, 1947. Pub. Health Rep. 64, 13:403 (Apr. 1), 1949.

**Welcome, Newcomer!**—It's hard to prove that diseases are spread through insanitary dishwashing practices. But who wants to eat from filthy restaurant dishes? Getting them decently clean is neither a simple nor an easy job. Methods are discussed in this

excellent paper appearing in Volume one, Number one of a promising addition to our field. We greet the newcomer.

MALLMANN, W. L. Are Restaurant Dishes a Public Health Hazard? Modern San. 1, 1:22 (May), 1949.

**Sensitive Barometer**—British infant death rates since the beginning of the century are plotted and analyzed in all the usual relationships, and they furnish revealing comparisons with our own. Theirs was 41 in 1947 as against our 34, but without our wide and violent regional fluctuations.

MARTIN, W. J. Infant Mortality. Brit. M. J. 4601:438 (Mar. 12), 1949.

**Not Only "the Help"**—Educate the public, educate the inspectors, educate the restaurant managers as well as "the help" and you can achieve good food handling practices, say these two Detroit officials.

MOLNER, J. G., and WILLSON, R. F. How Detroit Controls Food Sanitation. Modern San. 1, 1:30 (May), 1949.

**Discomforts, He Calls Them**—This is from the British medico who "invented" childbirth without anesthesia. "Two years ago—when I was in America—I found that the 'mind of woman' received little or no care either before or during labor. Now, however (things are different)."

READ, G. D. The Discomforts of Childbirth. Brit. M. J. 4606:651 (Apr. 16), 1949.

# Public Health in Foreign Periodicals

GEORGE ROSEN, M.D., PH.D.

AS a result of post-war developments, Turkey has come to occupy a position of considerable significance in the foreign policy of the United States. Despite this important fact, however, most Americans know little or nothing about Turkey. For this reason it may be of interest to review briefly recent Turkish activities in public health.

To understand its current problems, Turkish public health must be viewed in historical perspective. The Ottoman Empire had left the care of the public health largely to religious and other voluntary organizations. Little impression was made on the disease-ridden parts of Anatolia. The dissolution of the Ottoman Empire left a clear field for the creation of a public health organization on modern lines. When the national government was formed in Anatolia, a Ministry of Health and Social Welfare was created (1920). A campaign, almost on military lines, was organized to attack problems of disease. Since then efforts have been made to combat malaria, tuberculosis, syphilis, trachoma, and other communicable diseases rife in the villages. Special campaigns were undertaken to reduce infant mortality. As the peasants form an overwhelming proportion of the total population, rural hygiene occupies an important place in the Turkish public health program. On the whole, during the first two decades of its existence, the Turkish Republic had developed a basic health organization capable of expansion in the various branches of modern public health work.[1]

## TEN YEAR HEALTH PLAN FOR TURKEY

As in so many other countries, the war interrupted these activities. In 1946, however, the government again brought the problem of public health into the foreground of public attention. A Ten Year Health Plan was prepared by the

Ministry of Health and Social Welfare and was approved by the High Council of Health after consideration in November, 1946.[2] The aims of this plan are: (1) to further and to extend the scope of preventive medicine in Turkey; (2) to provide medical facilities for the rural population; (3) to increase the present public health force and to train new personnel in modern methods; (4) to improve existing hospitals and other health institutions and to bring them up to the best modern standards; (5) to establish and to operate in seven zones or regions of the country new health institutions which will provide needed medical and social services for those areas and will form nuclei for future medical schools; and finally (6) to set up a national organization for health insurance to give practical effect to these principles.

### CAMPAIGN AGAINST TUBERCULOSIS

Certain aspects of this plan have been put into operation more rapidly than others. Thus, particular attention is being paid to the control of tuberculosis. The Turkish Government sent three medical bacteriologists to Denmark to study the use of BCG in tuberculosis control.[3] As a result BCG vaccination is to be applied to new-borns and to school children. At the same time the Ministry of Health is increasing the number of beds for tuberculosis patients. In 1947, 406 beds were added and 308 more were to be added in 1948. After the completion of the National Health Plan the number of beds, which was 1,041 in 1946, should have reached a total of 5,570.[4]

In addition, considerable efforts have been made to enlist citizen participation in tuberculosis control work. The first Turkish tuberculosis association was established in Izmir in 1923, and was soon followed by those of Istanbul and a few other provinces. At the beginning of 1947 the Turkish Government organized a Tuberculosis Week. This action stimulated or brought to a focus interest in the tuberculosis problem. Within a short time the number of local tuberculosis organizations rose to 53. Early in 1948, during the second Turkish Tuberculosis Week, these associations met in Istanbul and decided to establish a National Tuberculosis Association with headquarters in Ankara. The National Association plans to undertake mass tuberculosis surveys and to assist in the application of the BCG vaccine.[5]

There is also considerable interest in public health circles in the newer methods of treating tuberculosis, particularly in the use of streptomycin.[6]

### OTHER COMMUNICABLE DISEASES

Communicable diseases that are likely to break out in epidemic form have always been a problem in Turkey, and owing to the poor hygienic conditions under which a considerable segment of the population lives these still occupy a prominent place in the public health program. Typhus fever, for example, has been widespread, often in epidemic form. Though Turkey did not take an active part in World War II, an epidemic of typhus fever broke out in 1942.[7] This outbreak reached its peak about the middle of 1943. The number of cases remained approximately the same until the first half of 1945, and did not return to the pre-war level until 1947. In 1943 there were 4,142 cases while in 1947 there were 641. Most of the cases appeared during the first half of the year, especially in March. The measures taken to combat the epidemic were mass vaccination, energetic application of DDT, and requirement of early reporting of cases.

Payzin and Akyay report on a vaccine employed during a pertussis epidemic in 1948.[8] In the course of this outbreak several strains of *Hemophilus pertussis* were isolated, and a new pertussis vaccine was produced. It is reported that

the vaccine was prepared according to the method of Kendrick and Eldering, using desiccated cultures. The product was tested according to methods employed by the U. S. National Institute of Health. The vaccine was used both for prevention and treatment, and is said to have given very satisfactory results. A group of 290 children who acquired the disease were vaccinated. Of this group, 80 per cent are reported to have responded favorably, that is, the course of the disease was shortened and the interval between coughing spells was increased.

Brucellosis is another problem of concern to Turkish public health workers. Efforts to establish the prevalence of the disease and to control it have only recently been started. In Turkey, *Brucella melitensis* is reported to be the chief etiologic agent. *B. suis* is said to be absent. The diagnosis is generally made in the laboratory by means of an agglutination test. Bilal points out, however, that for a long time each Turkish laboratory had its own method and employed its own diagnostic criteria. This situation caused a great deal of confusion, and in 1943 it was decided to establish a standard agglutination test for Turkey. The method of Stableforth was ultimately proposed. A skin test has also been developed.

In 1948, S. Payzin and S. B. Golem showed that Q fever is endemic in Turkey. Various strains of *Rickettsia burneti* have been isolated in different sections of the country. It is now known that the Balkan grippe which occurred during the war was due to an agent which Caminopétros showed to be identical with *R. burneti*. Payzin has recently reported an outbreak of Q fever in an Anatolian village.[10]

From time to time there have been outbreaks of plague in Turkey. On March 15, 1947, 3 cases of bubonic plague were reported in Akçakale.[11] Within twenty-five days the number of cases increased from 3 to 19. Most of the cases were of the axillary bubonic type and 5 were septicemic. No pneumonic plague was seen. It is also reported that DDT was used as an insecticide in a 6 per cent solution in oil.

Malaria is highly endemic in Turkey and is closely related to its physical geography and particularly its climate.[12] The disease is not very prevalent on the central Anatolian plateau, but the incidence of malaria is very heavy in the coastal region. All types of malaria are present in Turkey. Spring epidemics are caused by the tertian form in almost all areas. *Vivax* paroxysms predominate in July and August, *falciparum* from the end of August to October. Depending on the locality and the season, sometimes the benign tertian form predominates and sometimes the malignant tertian form. The quartan form is encountered in various parts of the country. The chief malaria vectors in Turkey are *Anopheles maculipennis*, *A. elutus* and *A. superpictus*. *A. bifurcatus* is also reported from southern Turkey.

The Turkish Government has devoted special attention to antimalarial work. Shortages arising from the recent war compelled a temporary curtailment of the control program. In 1945, however, the Ministry of Health and Social Welfare embarked upon an Extraordinary Malaria Control Program. The number of provinces in which control activities were carried on was raised from 33 to 53 and the total of malaria control districts was increased from 18 to 32.[13]

### HEALTH CENTERS FOR TURKEY

An interesting aspect of the Turkish public health program is the proposed system of health centers.[14] In its effort to place greater emphasis on preventive medicine it is planned to open health centers at a rate of one for every forty villages.[15] The health center program

will be concerned chiefly with maternal and child health, personal hygiene, prevention of communicable and epidemic disease, school health, social hygiene, narcotic control, sanitary engineering, and health education. Each health center will be expected to have medical and social records for the persons and families in the district and to follow up any condition requiring attention. Home visits will be made by visiting nurses and midwives. It is expected that when these centers are fully established it should be possible to carry out through them the campaigns against malaria, trachoma, hookworm disease, and other health problems of social concern. It is also expected that the medical and ancillary personnel will reside near the centers, so that the plans include provisions for living quarters. Public baths will also be constructed near the health centers.

It is realized that a plan of this kind requires an increase in personnel. Consequently, the Ministry of Health has decided to have 100 young doctors trained annually for public health work at the School of Hygiene in Ankara. The best of these physicians will be sent to the United States for further training.

Similarly, to provide enough public health nurses seven training schools for nurses will be opened in different parts of Turkey. Other ancillary personnel is expected to be recruited from the school for sanitarians at Istanbul and from among those taking special courses in the villages.

Of interest also is the considerable emphasis on health education. For this purpose so-called health museums are to be provided. These will really be centers from which health education programs will be carried out. It will be worth watching this ambitious program and to observe its progress.

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1. *La santé publique et l'assistance sociale en Turquie*, Direction Générale de la Presse, Ankara, 1941.

2. Millî Sağlik Plâni *(Birinci On Yillik); National Health Plan (First Ten Years)*, Ankara, 1947; Ministère de l'hygiène et de l'assistance sociale: *L'Activité et l'organisation médico-sociale en Turquie*, Istanbul, 1946.

3. Büyük Millet Meclisindeki 1948 senesi Bütce görüsmeleri dolayisiyle Sağlik ve Sosyal Yardim Bakam Doktor Bençet Uz'un konusmasi (Resume of a speech given by Dr. Bençet Uz, Minister of Health, during the budgetary discussions in the National Assembly), *Sağlik Dergisi* 22:3–10, 1948.

4. Sağlik ve Sosyal Yardim Bakam Dr. Bençet Uz'un Ikinci Verem Savas Haftasini Açis Nutku. 5/Ocak/1948 (Speech given by Dr. Bençet Uz, Minister of Health, at the opening of Tuberculosis Control Week, January 5, 1948, *Sağlik Dergisi* 22:14–18, 1948.

5. Ankara Veremle Savas Dernegi Genel Kurulu Toplantisi, *Sağlik Dergisi* 22:131–133, 1948.

6. See for instance O. H. Balkan: Akçiğer Tüberkülozunda Streptomisin, *Türk Ijiyen ve Tecrübi Biyoloji Dergisi* 8:69–76, 1948.

7. Niyazi Erzin: Ikinci Dünya Savasi Yillarinda Yurdumuzun Tifüs Durumu, *Türk Ijiyen ve Tecrübi Biyoloji Dergisi* 8:5–12, 1948.

8. S. Payzin and N. Akyay: Türkiyede ilk Bogmaca Asisi istihsali ve Bumin Tatbikatindan Alinan Sonuçlar, *Türk Ijiyen ve Tecrübi Biyoloji Dergisi* 8:103–111, 1948.

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11. N. Erzin and S. Payzin: Akçakale Vebasi (Plague in Akçakale), *Türk Ijiyen ve Tecrübi Biyoloji Dergisi* 7:31–46, 1947.

12. Abdülkadir Noyan: Summary of the free lecture on malaria, *Acta Medica Turcica* 1:32–37, 1948.

13. Ministère de l'hygiène et de l'assistance sociale: *L'Activité et l'organisation médico-sociale en Turquie*, Istanbul, 1946, p. 17.

14. *Ibid.*, *pp.* 19–23.

15. Turkish Republic, Ministry of Health: *Millî Sağlik Plâni Birinci On Yillik*; National Health Plan (First Ten Years), Ankara, 1947, pp. 80–82.

ADDENDUM

Our attention has been called to the fact that the two volumes—*Fiat Review of German Science 1939–1946, Bacteriology and Immunology*, and *Hygiene Part I. General Hygiene*—which were reviewed in this *Journal* in December, 1948 (pp. 1702–1703), are not available through military government channels. These volumes are now available under the title *Naturforschung und Medizin in Deutschland 1939–1946* through the firm of Stechert-Hafner, Inc., 31 East 10 Street, New York City. Further information concerning these volumes may be obtained from this source.

# ASSOCIATION NEWS

SEVENTY-SEVENTH ANNUAL MEETING
AMERICAN PUBLIC HEALTH ASSOCIATION
NEW YORK, N. Y., OCTOBER 24–28, 1949

## APPLICANTS FOR MEMBERSHIP

*The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.*

*Health Officers Section*

Holland M. Carter, M.D., P. O. Box 364, Madison, Fla., Director, Madison-Taylor County Health Units, State Board of Health

Eli Davis, M.D., Hadassah Medical Organizations, P. O. Box 499, Jerusalem, Israel, Director

Robert V. DiPasca, M.D., 84 Tanners Lane, Levittown, L. I., N. Y., Student, Columbia Univ. School of Public Health

Lt. Col. Thomas G. Faison, M.C., 5000 24th St., North, Arlington, Va., Medical Officer, U. S. Army

Walter P. Gardiner, M.D., 212 Audubon Blvd., New Orleans 15, La., Asst. Medical Director, Dept. of Hygiene and Child Welfare, Orleans Parish School Board

Roydon S. Gass, M.D., C.M., Ben Allen Rd., Nashville, Tenn., Director, Division of Tuberculosis Control, State Dept. of Public Health

Edwin M. Knights, Ph.D., Charles V. Chapin Hospital, Providence, R. I., Chief, Division of Sanitation, Providence Health Dept.

John P. Owen, M.D., 1880 Pacific St., San Francisco, Calif., Medical Director, American National Red Cross, Pacific Area

Robert M. Russell, M.D., Box 152, Monticello, Fla., Director, Jefferson County Health Dept.

George G. VanDyke, M.D., U. S. Quarantine Station, Rosebank, Staten Island, N. Y., Medical Consultant, International Airport Idlewild) and LaGuardia Airport

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Charles Baughn, Jr., M.S.P.H., 125 N. Drexel Ave., Indianapolis, Ind., Student, Univ. of North Carolina School of Public Health

George R. Callender, M.D., Veterans Administration, Room 836, Washington 25, D. C., Chief of Pathology

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Dr. Manuel J. Machiran, Compania Ron Bacardi, S.A., Santiago, Cuba, Chief Chemist

Walter N. Mack, Ph.D., Michigan State College, Dept. of Bacteriology, East Lansing, Mich., Asst. Professor of Bacteriology

Herbert R. Morgan, M.D., Univ. of Michigan, Dept. of Epidemiology, School of Public Health, Ann Arbor, Mich., Assoc. Professor of Epidemiology

Henry T. Pringle, Pringle, S. D., Student, Colorado Agricultural and Mechanical College

Norman J. Reilly, 86 Front St., Weymouth, Mass., Chemist, Milk Laboratory, Reilly's Laboratory Service

Leon A. Spiegel, Orchard Place, Cedar Knolls, N. J., Senior Laboratory Technician, Esso Standard Oil Co. Bayway Refinery

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*Statistics Section*

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William M. Nash, Box 128, Dayton, Tenn., Senior Sanitarian, Rhea County Health Dept.

Philip Rosenblum, 301 S. Boyle Ave., Los Angeles, Calif., Sanitarian, Los Angeles City Health Dept.

Carl H. Scholle, D.V.M., City of Dallas, Health Dept., Dallas, Tex., Chief Veterinarian

Alfonso Villa-Acosta, Mier y Pesado 222, Mexico, D.F., Sanitary Engineering Consultant, Ministry of Hydraulic Resources

*Industrial Hygiene Section*

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*Food and Nutrition Section*

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Grace McCormack, U. S. Fish and Wildlife Service, College Park, Md., Bacteriologist

Elmer L. Sevringhaus, M.D., Hoffman-LaRoche, Inc., Nutley 10, N. J., Director, Clinical Research

*Maternal and Child Health Section*

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*Public Health Nursing Section*

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Community Hospital, Kingsport, Tenn., Director

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## THE 77TH ANNUAL MEETING

New York, N. Y., October 24–28, 1949

*Hotel Reservation Form*

| | *Rooms with Bath* | |
|---|---|---|
| *Hotels* | *Singles* | *Doubles* |
| Belmont Plaza | $4.00–$7.00 | $6.00–$9.00 |
| Governor Clinton | 3.50– 5.75 | 5.50– 9.50 |
| Henry Hudson | 3.50– 5.00 | 6.00– 8.00 |
| Lincoln | 4.00– 7.00 | 6.00– 9.00 |
| Martinique * | 3.00– 5.50 | 5.00– 8.00 |
| McAlpin * | 4.00– 7.00 | 6.50–10.00 |
| New Yorker | 4.00–10.00 | 7.00–13.50 |
| Roosevelt | 3.50–10.00 | 8.00–14.00 |
| Statler | 4.50– 7.50 | 7.00–10.00 |
| Taft * | 3.75– 7.00 | 6.50– 9.00 |
| Tudor | 3.00– 5.00 | 5.00– 9.00 |
| Wentworth * | 4.00– 6.00 | 6.00– 8.00 |

* The starred hotels which are listed above also provide rooms without baths at the following rates:

| | *Singles* | *Doubles* |
|---|---|---|
| Martinique | $2.00–$3.50 | $4.00–$5.00 |
| McAlpin | 3.00– 3.50 | 5.00– 5.50 |
| Taft | 3.00– 3.50 | 5.00 |
| Wentworth | 3.00– 4.50 | 5.00– 6.00 |

*MAKE ROOM RESERVATIONS EARLY*

APPLICATION FOR HOTEL ACCOMMODATIONS
AMERICAN PUBLIC HEALTH ASSOCIATION
77th Annual Meeting and Meetings of Related Organizations, New York, N. Y.
October 24–28, 1949
(Note that the Meeting opens Monday, October 24 at 9:30 A.M.)

Please make hotel reservation as indicated below:
Double Room with Bath at $..... per day for ..... persons
Single Room with Bath at $..... per day for ..... persons
Double Room without Bath at $..... per day for ..... persons
Single Room without Bath at $..... per day
Suite at $..... per day for ..... persons

ARRIVING: OCTOBER .... Hour ..... LEAVING: OCTOBER .... Hour .....
Please print (or type) names and addresses of all occupants including persons making reservation.

NAME STREET ADDRESS CITY STATE

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.....
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Name .....
Street Address .....
City ..... State .....

Mail Direct to the Hotel of Your Choice.

RESERVATIONS WILL BE HELD UNTIL 6:00 P.M. ONLY, UNLESS THE HOTEL IS NOTIFIED OF LATE ARRIVALS

# EMPLOYMENT SERVICE

The following pages present information for those seeking qualified public health personnel and for those seeking positions in public health.

This is a service of the Association conducted without expense to the employer or employee.

Address all correspondence to the Employment Service, A.P.H.A., 1790 Broadway, New York 19, N. Y., unless otherwise specified.

## POSITIONS AVAILABLE

**Public Health Nurses** for a well established, generalized program, including school health, in a partly rural California county with a population of about 65,000. Present salaries: Junior grade, $2,640–$3,216; Senior grade, $2,916–$3,540. Probable general increase soon. Car needed; travel allowance 6¢ per mile; vacation, sick leave, all legal holidays, 38 hour week, merit system being established. Write: Health Officer, Box 360, San Luis Obispo, Calif.

**Public Health Nurses** with Certificate. Salary range $250–$290 per month according to educational qualifications and years' experience. Forty hour week; generalized program; opportunity for advancement. Position of educational director and assistant supervisor open. Write: J. B. Eason, M.D., Director, City Health Dept., Spokane, Wash.

**Public Health Educator I** (Lecturer in Social Hygiene); Salary $270–$325 monthly; female, 25 to 40; teacher training and experience in the field of teaching or college graduation and one year experience in public health education. Write: Henry A. Kjentvet, Personnel Officer, State Board of Health, Madison 2, Wis.

**Public Health Laboratory Technician**—degree, experience required, for County Laboratory serving 200,000 population; civil service, vacation, sick leave; salary $273–$341 monthly. Write: Dr. William F. Stein, County Health Officer, Rm. 203, Court House, Fresno, Calif.

**Executive Director** for voluntary nursing agency in midwestern city. B.S. degree and experience as educational director and supervisor essential. Generalized program. Students accepted for field experience. Salary open. Write **Box A-62,** Employment Service, A.P.H.A.

**Director for V.N.A.**, challenging opportunity to organize general nursing service; urban and rural; 40 hour week; liberal annual and sick leave; travel allowance, car essential. Starting salary: $3,600–$4,000; one hour from New York City. Write: Mrs. G. W. Clarvoe, Somerset Valley V.N.A., 97 E. Spring St., Somerville, N. J.

**Bacteriologist** to teach public health bacteriology course for physicians working toward M.P.H. degree in southern medical school. Background of formal education and practical experience in public health bacteriology required to qualify for position as assistant professor. Opportunity for research. Salary to be arranged. Write **Box A-61,** Employment Service, A.P.H.A.

**Qualified Supervising Public Health Nurse** for rural area on coast of Northern California. Generalized program; county population 60,000; state retirement plan; staff of six public health nurses; car furnished; starting salary $4,080. Write: Director, Humboldt County Dept. of Public Health, 805 Sixth St., Eureka, Calif.

**Public Health Dentist** wanted to head up program of public health dental health education in small suburb adjacent to Chicago. Specific graduate training in public health unnecessary. Salary open. Write: **Box A-63,** Employment Service, A.P.H.A.

**Medical Social Consultant** for city and county health department. Newly created position offering interesting experience in developing a program. Required degree in medical social work and minimum of three years' experience in discharge planning. Write: Personnel Office, City and County Bldg., Denver, Colo.

**Qualified Public Health Nurse** for rural area on coast of Northern California. Generalized program. Population 60,000, state retirement plan; car furnished; starting salary $3,200. Write: Director, Humboldt County, Dept. of Public Health, 805 Sixth St., Eureka, Calif.

**Physician as Director** — City-County Health Department. Population 50,000; staff of 9; salary for man with degree in public health $8,500 plus mileage. For further information write: Tuscarawas County General Health District, 210 West High Avenue, New Philadelphia, Ohio.

**Public Health Physicians** as Assistant

Chiefs in the Divisions of Communicable Diseases, Venereal Disease Control, and Local Health Administration. Civil Service; good retirement plan. Write: Roland R. Cross, M.D., Director, State Department of Public Health, Springfield, Ill.

**Director, Industrial Hygiene,** Public Health Physician at $7,500 per year; responsibilities include conferences with labor, industry, medical profession, etc., conducting industrial studies concerning health and safety standards, sanitation, first aid and medical services. Staff includes three engineers, two nurses, one chemist, and office personnel. Write: Henry A. Kjentvet, Personnel Officer, State Board of Health, Madison 2, Wis.

**Medical Health Officer,** public health training and experience to develop new health department. Population 38,000, 90 miles to St. Louis. Position open January 1, 1950. Write H. W. Willis, D.D.S., President, Jackson County Board of Health, Murphysboro, Ill.

**Senior Public Health Nurse** openings in one nurse services, some on itinerant basis. Starting salary $4,620–$5,313, depending on area to which assigned; annual increase of $180. Public Health training, minimum 2 years' supervised experience in generalized program and excellent references required. Thirty working days' annual leave, 2 weeks' sick leave, workmen's compensation and retirement plan. Write: Alaska Dept. of Health, Juneau, Alaska.

**Public Health Nursing Supervisor:** Beginning salary $4,980–$6,072. Public Health training, undergraduate degree, supervisory experience in generalized program and excellent references required. Leaves and other benefits as outlined for Senior Nurses above. Write: Alaska Department of Health, Juneau, Alaska.

**Public Health Nurse** for generalized program. Qualify for public health certificate and state registration. Salary range $250–$330. Mileage for own car. Retirement system, vacation, and sick leave. Write: Orange County Health Dept., Santa Ana, Calif.

**Physician**—young medical man for staff position, long established tuberculosis sanatorium in Adirondacks. Approved residency, good salary and housing for physician and family. Write **Box A-64,** Employment Service, A.P.H.A.

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**Announcement**

The West Virginia State Health Department will accept applications for the following positions to be filled July 1, 1949:

1. **Medical positions at State Level**

   Deputy Health Commissioner
   Director, Cancer Control
   Director, Communicable Disease Control
   Director, Industrial Hygiene
   Director, Tuberculosis Control
   Director, Venereal Disease Control
   Director of Hospitals
   Director of Mental Hygiene

   Must be eligible for West Virginia Medical License. Salary range is $7,200–$9,600.

2. **Local Health Officers**

   Minimum requirements: Graduation from Grade A Medical School. At least one quarter graduate study in public health in a recognized school of public health. Two years' full-time administrative experience in public health. Eligible for medical license in West Virginia. Salary range: $7,200–$9,600.

3. **Nursing Positions**

   **Registered Graduate Nurse**—no formal public health nursing education or experience required. Salary range $2,400–$2,640.

   **Public Health Nurse—Class B**—completion of one semester's or two quarters' work in public health nursing in an approved program. Salary range $2,520–$3,000.

   **Public Health Nurse—Class A**—completion of one year's approved program of study in Public Health Nursing. Salary range $2,760–$3,240.

   **Public Health Nursing Supervisor (State Level)**—completion of one year's

approved program of study in public health nursing in addition to two years' experience in a family health program under qualified supervision, and one year's experience as a generalized public health nursing supervisor. Salary range $3,360–$3,840.

4. **Engineer and sanitarian positions**

**Sanitarian**—minimum requirements—college graduation, salary range $2,640–$3,120.

**Junior Engineer**—graduation from an accredited four year college with a major in Engineering, salary $2,880–$3,840.

For all above positions write: Dr. N. H. Dyer, Commissioner
W. Va. State Department of Health
Charleston 5, W. Va.

## POSITIONS WANTED

**Laboratory Position**—B.S. degree in bacteriology; 5 years' experience; 2½ years in medical diagnostic public health bacteriology; 2½ years in clinical hospital laboratory work including all chemistries, bacteriology, and blood bank. Prefer a laboratory position in commercial industry. Write **Box L-7**, Employment Service, A.P.H.A.

**Physician**, M.P.H. with 11 years' experience in public health administration and epidemiology, on both state and local levels, desires public health administrative position. Now director of city-county health department. Offers paying $10,000 or more annually considered. Write **Box Ph-14**, Employment Service, A.P.H.A.

**Business Administrator, Lay Administrator;** age 38; married; 7 years' experience as business administrator of health department, large mid-west state, 7 years as sales analyst for large business machine company. Will consider opening with official or voluntary health agency, any location; salary consistent with past experience. Write **Box C-11**, Employment Service, A.P.H.A.

**M.D., M.P.H., internist-cardiologist,** eligible for Board of Internal Medicine. Public health experience includes generalized administration and organization of rheumatic fever program in official agency. Clinical experience includes hospital training, staff and Army appointments and private practice. Interested in adult hygiene, cardiac, chronic disease and rehabilitation programs, official or voluntary agency. Write **Box Ph-15**, Employment Service, A.P.H.A.

**Food and Water Analyst**, woman, 14 years' experience carrying increasing responsibility in food and water testing and research laboratories. Work involved principally chemical food analysis (organic and inorganic methods) and also bacteriological water examinations. Academic qualifications and degrees in chemistry. Write **Box L-8**, Employment Service, A.P.H.A.

**Medical Administrator**—11 years' public health administration, 15 years' hospital administration (3 years assistant medical director, The Johns Hopkins Hospital), superintendent two large hospitals, New York City, 8 years. Desires responsible administrative position. Write **Box C-12**, Employment Service, A.P.H.A.

**Nutritionist:** B.S. and M.S. degrees. Twelve years of varied experience in nutrition, diet-therapy and teaching. Available now. A.D.A. member. Excellent references. Write: **Box N-1**, Employment Service, A.P.H.A.

*A.P.H.A. membership application blank on page XXXIII*

## *Advertisement*

**All communications should be sent to Burneice Larson, Medical Bureau, Palmolive Building, Chicago 11, Ill.**

# Opportunities Available

WANTED—(a) Health director; city-county health department, population 50,000; staff of nine; Middle West. (b) Director of student health department, eastern university. (c) Health officer to direct district of ten counties; Middle West. (d) Public health physician; newly created position; director, division of geriatrics and adult hygiene; metropolitan health department. (e) Woman physician to direct student health program; 1,000 women students and faculty members. (f) Director, student health; liberal arts college; approximately 8,000 students; well equipped hospital; duties administrative rather than clinical; Pacific Coast. (g) Professor of public health; duties include directorship, student health department, state university; Middle West. **PH6-1** Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

WANTED—(a) Health educator; Master's degree desirable; New England division of national organization. (b) Sanitary engineer; state department of health; Middle West. (c) Health educator with Spanish-American background to work with special groups; West. (d) Sanitary engineer to supervise all sanitation with respect to food, water, milk, other sanitation problems; town of 100,000 near Chicago. (e) Health education coordinator; county health department; California. (f) Director, public health laboratory; Ph.D. required; $4,800–$5,400; Middle West. (g) Health educator to join faculty, university department of health; rank: instructor or assistant professor. **PH6-2** Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

WANTED—Public health nurses for the following: (a) Assistant professorship, public health nursing; eastern university. (b) Directorship, school health program; public schools; Middle West. (c) To direct newly established visiting nurse association; vicinity New York City; $4,000. (d) Staff appointments; generalized program; Southern California. (e) To direct educational program, privately supported agency operating visiting nurses service; large city, Southeast. (f) To direct generalized program including school health; $4,500–$5,000; Middle Western metropolis. (g) Maternal and child health nursing consultant; Pacific Coast; $4,000. (h) Student health nurse; liberal arts college; university center. **PH6-3** Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

## *Advertisement*

# Opportunities Wanted

Public health administrator; B.A., M.S., M.D., eastern schools; Master of Public Health, Johns Hopkins; several years, director of public health program in foreign country; 8 years, professor of preventive medicine and public health, university school of medicine; for further information, please write Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

Public health dentist; D.D.S., M.P.H.; past several years, public health dentist, state department of dentistry; for further information, please write Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

Sanitarian; B.S., Civil Engineering; past 8 years, sanitary engineer, metropolitan health department; for further information, please write Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

Health educator; M.S., Health Education; will receive doctorate in Health Education this summer; since 1942, professor of health education, liberal arts college; for further information, please write Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

Public health nursing administrator; B.S. (Education); M.A. (Public Health Nursing); 8 years' teaching; 3 years, supervisor, generalized program; for further information, please write Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

# NEWS FROM THE FIELD

## ASSOCIATION PROPOSES NATIONAL CONFERENCE ON MEDICAL CARE

A national conference to discuss the health and medical care problems now before the nation and to be sponsored by the major professional organizations concerned, together with a broad representation of the general public, was proposed on May 6 by the American Public Health Association.

Hugh R. Leavell, M.D., Chairman of the Executive Board of the Association and Professor of Public Health Practice at the Harvard School of Public Health, Boston, upon authorization of the Executive Board, invited the American Medical Association, the American Hospital Association, and the American Public Welfare Association to join with the A.P.H.A. in sponsoring such a conference. It was expected, according to Dr. Leavell, that other professional organizations concerned, such as the American Dental Association, the nursing organizations, and other related groups might be invited. Certainly, management, labor, farmers, and other consumer groups would be included as participants "in order to obtain the widest possible representation of constructive opinion and knowledge and to assure widespread understanding and support for any decisions reached."

According to Dr. Leavell the purpose of the conference would be to determine areas of agreement and to clarify disagreements on issues of health and medical care now facing the nation. It is proposed that the conference be held during July, 1949.

Dr. Leavell pointed out that the four major organizations which had been proposed as sponsors of this conference already have reached encouraging and substantial agreement on such matters as planning for the care of the chronically ill. "It would be highly unfortunate if controversies based on differences of opinion over a few aspects of the overall problem of the nation's health should be allowed to overshadow the many points on which these groups are in basic agreement." Dr. Leavell expressed real hope that such a conference may be useful in helping to find needed answers to problems of health and medical care.

In the view of the Executive Board of the American Public Health Association, such a proposed meeting should be kept as small as possible consistent with balanced representation, and should of course communicate to the public such information as is agreeable to all parties concerned. It is the intent of the American Public Health Association that the organizations which sponsor the gathering and other participants should be free to determine the matters of agenda and procedure, according to their mutual agreement.

## MORE REGIONAL CONFERENCES ON LOCAL HEALTH UNITS

The third and fourth in a series of regional conferences on local health units under the sponsorship of the National Health Council were held in Kansas City and Omaha, April 20–22 and 25–27, respectively. Each conference was attended by about 100 persons. At the first were present selected individuals interested in local health problems from Arkansas, Kansas, Louisiana, Missouri, and Oklahoma; at the second similar delegates from Iowa, Minnesota, Nebraska, North Dakota, and South Dakota.

In addition to the 2 day program heretofore planned for such conferences, one for committee discussions and reports and one for state committee dis-

cussions and reports, an additional half day was devoted to orienting delegates in the conference procedure, particularly having a sample group discussion, and to giving state groups an opportunity to organize.

Among the new developments for these conferences was the pre-conference preparation made by all 5 of the states taking part in the Kansas City Conference. Louisiana, for example, sent its 12 delegates a kit of material including facts about parish public health budgets and expenditures in relation to other services, maps of proposed health centers, a description of a local health unit in action, and other pertinent material.

In each conference, the 5 state representatives developed separate plans for extending local health services in their states. A plan common to practically all of the participating states that came out of the conference was the organization of state health councils where they do not now exist and the development of community councils. The state groups at the conference constituted themselves a nucleus for carrying out the state programs. This was most clearly evident in the Oklahoma delegation which resolved "that this group act as a nucleus for a state health council for the purpose of assisting the State Health Department in its plan for complete coverage of the state with local health units." The Iowa group adopted an 11 point program on which to begin work at a meeting of the conference group within a month. The Nebraska group committed itself to securing a state board of health for its state. The progress of the plans outlined will be followed by the National Advisory Committee on Local Health Units and reported in its *Bulletin*.

Among the features of the Kansas City Conference was a disposition to make sure that the extension of local health services would enhance and augment the services of the private physician. Here also was given a detailed discussion of the new Missouri permissive legislation, which gets around certain difficulties of the state constitution and new charter to develop the legal framework for local health services. This program was described by Chester Starr, Director of Health Services of the Missouri Farm Bureau Federation.

At the Omaha Conference some of the developments now in progress in the Missouri Valley Development were outlined by Dr. Joseph Dean of the Regional Office of the U. S. Public Health Service. The increased water available for irrigation, the increase in population, and the development of power and industrial potential will change the economy of the area. It is thus necessary to make health plans flexible enough to meet changing conditions.

At this conference there was given a brief outline of North Dakota's attempt to begin the groundwork for local health service in spite of the inability to secure full-time medical health officers. This is through the training of administrative assistants in health education techniques who would go into local areas to organize community health services, getting the support of local practising physicians. It is hoped in this way to introduce the beginnings of local health service so that it can be extended as personnel shortages abate and North Dakota salaries are increased to a competitive level.

In the planning of the two conferences, each of the 10 state health officers was asked to select a team of about 15 persons broadly representative of both lay and professional health interest. The Kansas City Conference of 101 persons met this qualification reasonably well. The 5 state teams included from 12 to 21 persons, the largest number coming from the host state, Missouri.

The Omaha Conference (because of a number of factors) was less represent-

ative either as to numbers or variety of interest. North Dakota, with the smallest population represented and the most remote from the seat of the conference, had only 2 representatives, both staff members of the State Health Department. On the other hand, 48 Nebraskans registered for the conference, the majority of them professional workers.

Thomas D. Dublin, M.D., Director of the National Health Council, presided at the meeting; Haven Emerson, M.D., gave the background address and summarized the Kansas City Conference; Roscoe P. Kandle, M.D., Field Director, American Public Health Association, gave the background address; and William R. Willard, M.D., Associate Professor of Public Health, Yale School of Medicine, summarized the Omaha Conference; John W. Ferree, M.D., and S. S. Lifson of the American Heart Association were in charge of plenary session discussions. Discussion leaders and recorders were selected from the state teams.

The following member agencies of the National Health Council had representatives at one or both conferences:

American Cancer Society, American Heart Association, American Medical Association, American Nurses' Association, American Public Health Association, American Red Cross, National Foundation for Infantile Paralysis, National Organization for Public Health Nursing, and the National Safety Council.

Detailed proceedings of the conferences are being published by the National Health Council and will be available for limited distribution.

### KNUDSEN MEDAL TO DR. ROBERT A. KEHOE

At the April meeting of the American Association of Industrial Physicians and Surgeons in Detroit, Mich., the William S. Knudsen Medal was presented to Robert A. Kehoe, M.D., of the University of Cincinnati, for his work in the detection and control of lead poisoning.

The Health Achievement in Industry Award was presented to the Rome Cable Corporation of Rome, N. Y., for its recently inaugurated medical department for employees.

### COLORADO REPORTS ANIMAL DISEASES

The Colorado State Department of Public Health has instituted a program of reporting animal diseases that are transmissible to human beings. Each veterinarian furnishes reports on forms designed for this purpose. Additional information may be obtained from Martin D. Baum, D.V.M., Director, Veterinary Public Health Services, State Office Building, Denver 2.

### DR. HAVEN EMERSON SPEAKS ON PREVENTION OF BLINDNESS

Haven Emerson, M.D., was the principal speaker on April 27 at the annual meeting of the Maryland Society for the Prevention of Blindness in Baltimore. In discussing the relationship of voluntary and official health agencies in the program of sight conservation, he emphasized the need for well organized local health departments for maximum effectiveness of specialized sight conservation programs.

### CEREBRAL PALSY RESEARCH UNIT BEGUN

The establishment of a brain registry, to collect case histories of cerebral palsy and obtain for medical study the brains of deceased victims of this disease, has been announced by the American Academy for Cerebral Palsy. These procedures will add considerably, it is believed, to present medical knowledge of cerebral palsy.

### KENTUCKY MOBILE MEDICAL CLINIC

The Jefferson County Kentucky Fiscal Court has presented to the Louis-

ville-Jefferson County Board of Health the first mobile medical clinic in Kentucky, a 30 foot trailer fully equipped as a doctor's office. Its services include examinations, immunizations, child health work, and other preventive measures which are being maintained for the residents of outlying areas of the county where regular scheduled routes will be followed. A physician, a registered nurse, and a driver compose the trailer staff. During its first month of operation, the "doctormobile" brought medical service to 400 persons.

### UNION LEGAL IN WASHINGTON

The Washington State Legislature has just passed Senate Bill 25 which permits cities of over 100,000 population to establish joint health departments with their counties. This legalizes the "gentleman's agreement" cooperation already in existence between Seattle and King County and between Tacoma and Pierce County. Spokane is the one remaining city of that size not yet operating jointly with its county.

### 100 PER CENT IN NORTH CAROLINA

The North Carolina State Health Officer, John W. R. Norton, M.D., has announced that by July 1, 1949, every county in the state will have an organized public health department. The first of the year, 96 counties were served by 70 health departments; since then the remaining 4 counties have set up or made provisions for establishing health departments.

### FIRST COUNTIES IN INDIANA VOTE CONSOLIDATION THROUGH REFERENDUM

Elkhart and Clark are the first counties in Indiana to take advantage of a 1947 referendum law by which citizens may vote to establish full-time county or multi-county health departments. The recent referendum vote in the 2 counties favored the establishment of county health departments by large majorities. In Elkhart County with a population of about 75,000, this will result in the consolidation of 4 separate jurisdictions, each currently served by a part-time health officer. Clark County's department serving about 35,000 persons will consolidate two current jurisdictions with part-time health officers.

With the establishment, by resolution, of a full-time department in Kosciusko County in January, there are now 9 full-time local health departments in the state serving about 30 per cent of the population.

### KANSAS'S FIRST MULTI-COUNTY UNIT

The commissioners of two Kansas counties, Butler and Greenwood, recently approved consolidations of the health services of the two counties with costs to each based on a per capita ratio of the two counties' populations. The new consolidated unit will serve a population of nearly 50,000 and will be the first multi-county unit in Kansas.

H. W. Lane, M.D., present Health Officer of Butler County, will direct the consolidated unit with headquarters at El Dorado. A subcenter will be located in Eureka of Greenwood County.

### DR. W. W. FRYE BECOMES DEAN AT L. S. U. SCHOOL OF MEDICINE

The appointment of William W. Frye, M.D., Ph.D., who has been Assistant Dean at Tulane University School of Medicine and Director of the Division of Graduate Medicine, to become Dean of the Medical School at Louisiana State University, New Orleans, was recently announced to become effective as of May 1.

Dr. Frye received a Ph.D. degree at Ohio State University in 1931. He later completed the medical course at Vanderbilt University, where he was later Chairman of the Department of Preventive Medicine and Public Health. He moved to Tulane University in July,

1948, and continued his teaching and research in tropical medicine. Dr. Frye is a member of the Committee on Research and Standards of the A.P.H.A.

WASHINGTON AWARD TO JOHN L. SAVAGE

John L. Savage was recently awarded the 1949 Washington Award "for his unselfish public service devoted to the creation of monumental hydraulic structures utilizing natural resources." The Washington Award is made annually by a joint committee of the American Society of Civil Engineers, American Society of Electrical Engineers, American Society of Mining and Metallurgical Engineers, and the Western Society of Engineers.

In addition to Mr. Savage's important role in the design of many of the important United States hydraulic installations, he also designed the Yangtze River dam project in China.

A. M. A. BUREAU DIRECTOR IN GERMANY

Dr. W. W. Bauer, Chicago, Director of the American Medical Association Bureau of Health Education, sailed for Germany March 22, 1949, to consult with U. S. Military Government officials and with the German medical profession about the rehabilitation of postwar German medicine, especially with relation to public health and health education. Dr. Bauer's services have been loaned by the American Medical Association to the U. S. Department of the Army. He is scheduled to serve in Germany three months, returning by way of London, where he will spend a few days observing British health and medical systems.

PUBLIC HEALTH SPECIALTY BOARD SELECTS REPRESENTATIVES

The American Board of Preventive Medicine and Public Health, Inc., at a meeting of the Trustees in Washington, D.C., on April 25, appointed representatives of the specialty board to the Advisory Council on Medical Specialty Boards. Ernest L. Stebbins, M.D., Secretary of the American Board of Preventive Medicine and Public Health, Inc., and William P. Shepard, M.D., San Francisco, Calif., were designated to represent the board on the Advisory Council.

ANOTHER COLORADO COUNTY ORGANIZED

On January 1, 1949, the Mesa County Health Department began operating from headquarters in the Grand Junction Health Center. The Director is Margaret E. N. Beaver, M. D.; George A. Prince is sanitary engineer; Grace Larson, public health nurse supervisor. Several staff members were formerly in the Grand Junction Health Department now consolidated in the new county unit.

Mesa, with a population of about 35,000, is the 21st Colorado county to have organized public health services. Housed in the department's health center are the local cancer, tuberculosis, crippled children's, infantile paralysis societies, as well as certain activities of the county medical society.

VA AREA DIRECTORS

The following six area medical directors to supervise hospitals and other VA medical matters have been appointed:

Washington, D. C.—Delmar Goode
Atlanta, Ga.—Frank B. Brewer
Boston, Mass.—Francis B. Carroll
Fort Snelling, Minn.—Einar C. Andreassen
St. Louis, Mo.—Charles H. Beasley
San Francisco, Calif.—Cyril H. C. Francis

MINNESOTA HEALTH DAYS AGAIN

Three more of Minnesota's "Health Days" have now been held. On February 22, a group representing 8 southwestern counties met at Pipestone for the second southwestern Minnesota Health Day. A new feature of this meeting was a panel discussion arranged and presented by high school students who tossed their own questions on farm and home safety to 3 adult experts.

The first Health Day in a metropolitan area was that of Minneapolis and Hennepin County's Community Health Day on March 4. This was sponsored by the Women's Auxiliary of the Hennepin County Medical Society. Among other needs it brought to light was that of full-time health services for rural areas.

The second metropolitan Health Day was held on April 21 by St. Paul and Ramsey County. This was sponsored jointly by the Women's Auxiliary of the Ramsey County Medical Society and the St. Paul Area Public Health Council made up of 54 organizations.

Sixty of Minnesota's 87 counties have now been involved in "Health Days," the technique of that state for focusing on public health needs and the organization of community health councils and multi-county health departments.

### U.S.P.H.S. ANNOUNCES ESTABLISHMENT OF MENTAL HEALTH INSTITUTE

According to an announcement by Dr. Leonard A. Scheele, Surgeon General of the U.S. Public Health Service, the National Institute of Mental Research has been established under the directorship of Dr. Robert H. Felix, who for several years has been the head of the Division of Mental Hygiene in the Service. The division has now been abolished.

The responsibilities which the division administered in the Fort Worth and Lexington Hospitals for Narcotics cases are transferred to the U.S.P.H.S. Hospital Division.

While the research center is being erected in Bethesda, Md., for the Service at a cost of some $40 million, the National Institute of Mental Research will occupy offices in the south Federal Security Building, Washington.

### MINNESOTA'S NEW HEALTH UNIT LAW

The recent session of the Minnesota Legislature passed a bill authorizing county and multi-county health departments, which was signed by Governor Youngdahl on April 14. Similar bills were defeated in 1945 and the 1947 legislative sessions.

The act provides for the establishment of county or multi-county health departments either by resolution of the county commissioners or by a referendum vote.

Cities of the first and second class, of which there are 6 representing about one-third of the state's population, are exempted from the provisions of the act but may elect to join the county or multi-county health department.

According to the act all other local boards of health are divested of their current powers in areas included in a county or district health jurisdiction. There is provision for a local tax levy not exceeding one mill to support local health departments.

A provision orginally in the bill but stricken out before its final passage provided for a full-time medical health officer with special training or experience in public health administration. The law, as passed, requires only that the county or district health officer "be a doctor of medicine duly licensed and registered in the state of Minnesota." His appointment by the local board is for a 5 year term.

### NEW JERSEY SURVEYS ITS HEALTH

In April the New Jersey State Health Department began a five year research survey of health practices and methods in local health departments of the state. It is planned to improve evaluation methods and to evolve a set of standards of public health practice for New Jersey based on optimal health conditions. The Commissioner of Health is required by the state reorganization law of 1947 to recommend " recognized public health activities and minimum standards of performance " for local health departments to the State Public Health

Council, which in turn is required to prescribe standards.

The survey, which operates as a part of the Bureau of Local Health Services, is made possible by a grant from the Commonwealth Fund of New York. The survey team is made up of a public health physician, public health engineer, public health nurse, statistician, and clerical workers. Staff personnel of the health department serve as expert consultants. The participation of local workers and citizens in each area is a part of the plan.

### MONTANA REORGANIZES STATE BOARD OF HEALTH

A bill which had the support of the Medical and Dental Associations and the Montana Health Planning Committee, as well as the Public Health League of Montana, was passed by the Legislature and has been signed by Governor John W. Bonner.

Under its provisions, a new seven member state board of health will meet July 1, 1949, to organize. The board will be composed of 3 physicians, 1 dentist, and 3 lay members, replacing the present board made up of 5 physicians, a representative of pharmacy, and a representative of food distributors.

The new law provides that the executive officer shall be appointed by the board from persons having a degree of Doctor of Medicine and successful completion of at least 1 year of graduate study in an approved school of public health, plus at least 2 years' experience in administrative practice as a full-time public health officer. In the absence of such a qualified person the board may appoint for a period of not more than 1 year a physician with at least 5 years of active practice who shall not be eligible for reappointment.

### CÖOPERATION IN DISASTER HOSPITALIZATION

The American Red Cross and the American Hospital Association have a coöperative understanding on hospitalization of disaster sufferers. This understanding has been printed for permanent reference as No. 6 in a series of preparedness leaflets, and was distributed with the January-February, 1949, issue of *Disaster*. The purpose of this understanding is to develop a plan for the coördination of hospital facilities in a disaster area so that hospital facilities may be used to the best advantage for disaster sufferers.

### INDIA'S FIRST CHILD WELFARE EXHIBIT

A child welfare exhibit, presenting some aspects of children's problems all over the world, began in New Delhi, India, April 18. The first of its kind in India, the exhibition was held under the auspices of the Indian National Committee of the United Nations Appeal for Children. Invitations were sent to all foreign countries and to provincial and state governments in India.

### KENTUCKY PUBLIC HEALTH ASSOCIATION

The Kentucky Public Health Association was organized at a meeting held in Louisville on March 23 to 25. At this initial meeting, the registered attendance was 685. Officers of the new society are as follows:

*President*—J. F. Blackerby, Director, Division of Vital Statistics, State Department of Health, Louisville

*President Elect*—Margaret East, Director, Division of Public Health Nursing, State Department of Health, Louisville

*Vice-President*—Paul Modica, Supervising Sanitarian, Lexington-Fayette County Health Department, Lexington

*Secretary-Treasurer*—Bruce Underwood, M.D., State Health Commissioner, Louisville

### REVIEW OF SOVIET MEDICINE SUSPENDS

*The American Review of Soviet Medicine* has suspended publication. For the past 5 years it has served to link medical workers in Soviet Russia with others in the world. In announcing the sus-

pension, its consultant editor, Dr. Henry E. Sigerist, said "much to our regret we are unable to carry on the publication for reasons which are so obvious we need not elaborate on them." The American-Soviet Medical Society, which published the *Review*, will continue in existence and will keep its members informed of medical developments in the U.S.S.R. as opportunity develops. It will also continue the society library at the New York Academy of Medicine.

### KANSAS ALSO TRAINS RURAL DOCTORS

The 1949 Kansas legislature has appropriated nearly $4 million for a threefold program of training doctors for rural areas. The plan was worked out by the Kansas Medical School and the farm organizations gave support to it in the legislature. The plan includes:

a. An expansion of the University of Kansas Medical School graduates by 20 to 25 physicians.
b. Individual communities will set up the graduates in practice at a cost of some $15,000 which the doctors will pay back in installments.
c. The Medical School has planned a series of refresher courses to keep rural doctors abreast of medical science and technical advances.

### CITY PLANNING SOUTH OF THE BORDER

*A Planning Program for the Capital of Costa Rica* was recently published by the Pan American Union. The study was made by Anatole A. Solow, Housing and City Planning Specialist of the Union's Labor and Social Information Division, who was formerly for two years Research Associate of the A.P.H.A.'s Committee on the Hygiene of Housing. His study of San Jose was made under a coöperative arrangement between the city, Costa Rica, and the Pan American Union.

## PERSONALS

E. M. BINGHAM, M.D.,† has been appointed District Health Officer of the San Joaquin Local Health District, Stockton, Calif., succeeding JOHN J. SIPPEY, M.D., deceased. He has served for 3 years as Assistant Health Officer in San Joaquin.

ALLEN D. BRANDT, Sc.D.,* head of Bethlehem Steel Company's Industrial Hygiene Department, has been elected President-Elect of the American Industrial Hygiene Association to accede to the office of President at the next annual meeting in Chicago in 1950.

J. EDGAR CASWELL,† Acting Director of the Bureau of Public Health Education, District of Columbia, was appointed Director of the bureau succeeding MELVIN P. ISAMINGER,† deceased.

COLORADO STATE DEPARTMENT OF HEALTH, CHANGES IN PERSONNEL:

ALFRED R. MASTEN, M.D.,† has rejoined the State Department as Director of the Tuberculosis Control Section after serving in a similar capacity with the Oregon State Health Department for the last 2 years.

ROBERT D. BOTTOMS is Personnel Officer in the Business Management Division, State Department of Health.

PAUL D. BRUNS, M.D., is Obstetrical Consultant in the Maternal and Child Health Section, State Department of Public Health, and staff member of the University of Colorado Medical Center.

PAUL B. CORNELY, M.D., Dr. P.H.,* Professor of Preventive Medicine and Public Health at Howard University, Washington, D.C., has recently also become Medical Director of Freedmen's Hospital connected with the Medical School.

HERBERT R. DOMKE, M.D., M.P.H.,† presently Research Fellow in Biostatistics, Harvard School of Public Health, and formerly Chief Medical Officer of the Chicago Health Department, has been appointed Commis-

sioner of Health of St. Louis County, Missouri, effective July 1. He will also serve as Assistant Professor of Preventive Medicine of Washington University School of Medicine, St. Louis.

SAIDIE ORR DUNBAR,* for 34 years Executive Secretary of the Oregon Tuberculosis and Health Association, and past president of the General Federation of Women's Clubs, received the first annual award of the Association at its recent annual banquet, for "outstanding accomplishment" in the field of public health.

GEOFFREY EDSALL, M.D.,* has been appointed Professor of Bacteriology at Boston University Medical School effective July 1. He has been Assistant Director and recently Director of the Division of Biologic Laboratories of the Massachusetts Department of Public Health.

LEROY L. FATHERREE, M.D.,* has resigned as Health Officer of Omaha, Neb., to become Health Officer of the Will County Health Department, Illinois.

FLOYD M. FELDMANN, M.D., M.P.H.,* present Medical Director, Central Coordination and Analysis Office, and Executive Secretary, Tuberculosis Study Section, U.S. Public Health Service, will join the staff of the National Tuberculosis Association in early summer as Assistant to the Managing Director, JAMES E. PERKINS, M.D.*

EDITH M. GATES,* has accepted a position as Director of Adult Health Education with the District of Columbia Tuberculosis Association, effective May 1.

W. GEORGE GOULD,† has been appointed Field Consultant, Public Health Division of the American Heart Association, to assist the Director, JOHN W. FERREE, M.D.,* in the organization of public health programs for affiliated state and local heart associations.

JAMES C. HART, M.D.† was appointed Director of the Bureau of Preventable Diseases of the Connecticut State Department of Health, effective March 1. He has been associated with that department since 1940. He succeeds EUGENE E. LAMOUREUX, M.D.,† deceased.

EUNICE GOODMAN HOLMES has been appointed nursing supervisor of West Virginia Health Districts 5 and 6, with headquarters in the Tri-County Health Department, Martinsburg.

NORVIN C. KIEFER, M.D.,† of the U.S. Public Health Service staff has been appointed Director of the Medical Division, National Security Resources Board, succeeding JAMES A. CRABTREE, M.D., Dr.P.H.,* who is currently visiting several schools of public health. Dr. Kiefer has been Chief of the Health Emergency Planning Unit, Surgeon General's Office, U.S.P.H.S.

NELSON R. KRAEMER,† former Executive Secretary of the Hudson County (N.J.) Tuberculosis League, joined the staff of the National Tuberculosis Association on March 7 as Associate Director of Seal Sale.

VERNON W. LIPPARD, M.D., has been appointed Dean of the School of Medicine, University of Virginia, Charlottesville, succeeding H. E. JORDAN, M.D., retired.

HENRY B. MAKOVER, M.D.,* has been appointed Director of Survey of the Health Insurance Plan of Greater New York, to be responsible for conducting a study and critique of the medical services provided by the group practice units associated with the plan.

THOMAS F. MCGOUGH, M.D.,* formerly Health Commissioner, Tuscarawas County Health Department, New Philadelphia, Ohio, has accepted the

* Fellow, A.P.H.A.
† Member, A.P.H.A.

position of Health Officer of Alexandria, Va., effective May 15.

R. T. MEYER, M.D., recently public health officer with the American Military Government in Germany, has begun his duties as Health Officer of the Adams, Arapahoe, and Jefferson Counties Health District in Colorado.

HAROLD G. NELSON, M.D.,† Director of the Division of Epidemiology, Kansas State Board of Health, has resigned to enter private practice at the A. B. Smith Clinic in Stillwater, Okla.

OKLAHOMA: PUBLIC HEALTH NURSES ASSIGNED TO LOCAL HEALTH DEPARTMENTS

EVELYN WILSON BELLGINY, Payne County

ADA BOYD and WANDA J. REDPATH, Pittsburgh County

ELIZABETH M. JACOBS, Muskogee County succeeding HALLIE H. WILLIS, resigned to take a similar position in California.

EDITH DICKSON,† Comanche County.

DONALD E. PORTER,† previously assistant to the statistician GODIAS J. DROLET,* has been named secretary of the tuberculosis division of the New York Tuberculosis and Health Association to have charge of all x-ray activities of the Association in Manhattan, including industrial and community case finding surveys, and to serve also with the Tuberculosis Sanatorium Conference of Metropolitan New York.

GEOFFREY W. RAKE, M.D., Head of the Division of Microbiology, has been appointed Director of the Squibb Institute for Medical Research to succeed JAMES A. SHANNON, M.D., resigned to become Associate Director in charge of research, National Heart Institute.

JEANNETTE ROSENSTOCK,* Director of Nursing Service in the Topeka-Shawnee County Health Department, Kansas, on May 1 became Assistant Chief in Administration in the Bureau of Public Nursing, Pittsburgh, Pa.

CATHRYN C. ROTONDON, M.D., began her work as Director of the Division of Maternal and Child Health of the Kentucky State Health Department on March 14, replacing ALICE D. CHENOWETH, M.D.,* who is now with the U.S. Children's Bureau.

EDWARD M. THOMPSON, M.D.,† formerly with Lexington-Fayette County Health Department of Kentucky is now Health Officer of the DeWitt-Piatt County Health Unit in Illinois.

VIRGINIA STATE HEALTH DEPARTMENT —NEW HEALTH OFFICERS ASSIGNED TO LOCAL HEALTH DISTRICTS:

J. E. MALCOMSON, M.D., Halifax County

WILLIAM D. ANDERSON, M.D., Russell-Wise

E. D. HARDIN, M.D.,† formerly in Pittsylvania, now located in Page-Warren-Shenandoah

ALICE WATERHOUSE, M.D.,† a Health Officer in the New York City Department of Health, has been named Director of the newly created Bureau of Adult Hygiene.

WILHELMINA L. WHISNER,† has been appointed teaching supervisor in the Kanawha-Charleston Health Department, West Virginia.

## Deaths

F. A. BABOUR,* Consulting Hydraulic and Sanitary Engineer, Boston, Mass. (Engineering Section).

CHARLES J. BALL,† Director, Bureau of Sanitation, New Orleans, La., Health Department (Health Officers Section).

JOE RAINEY CLEMMONS, M.D.,† former Medical Director and Executive Vice-President of Roosevelt Hospital, New York, died April 2 at the age of 52, after a long illness (Unaffiliated).

* Fellow, A.P.H.A.
† Member, A.P.H.A.

GILBERT COTTAM, M.D.,* died March 4 at the age of 75 (Health Officers Section).

ALFRED LEE FRANKLIN, M.D., 29 year old research scientist in the Nutrition and Physiology Research Department of the Lederle Laboratories Division of American Cyanamid Company, died recently of chronic nephritis at Cedars of Lebanon Hospital, Los Angeles, Calif.

MELVIN PRICE ISAMINGER, Dr.P.H.,† died recently after a long illness. He was Director of the District of Columbia Health Department's Bureau of Public Health Information (Public Health Education Section).

GEORGE F. MANGONE, M.D.,† Health Officer, Department of Health, Union City, N. J. (Health Officers Section).

CARL E. MCCOMBS, M.D.,* died May 6 after a long illness. He retired last year as a staff-member of the Institute of Public Administration, New York (Public Health Education Section).

LEOPOLD M. ROHRA, M.D., died April 6 at the age of 62. Dr. Rohr was a medical practitioner in New York for nearly 40 years and was well known for his work for public health.

FREDERICK F. TISDALL, M.D.,† Assistant Professor of Pediatrics, University of Toronto, Canada (Maternal and Child Health Section).

CAMILLO E. VOLINI, M.D.,† Superintendent of Clinics, Municipal Tuberculosis Sanitorium, Chicago, Ill., died June 28, 1948 (Health Officers Section).

## CONFERENCES AND DATES

American Association of Social Workers. Cleveland, Ohio. June 10–12.

American Congress of Physical Medicine, Netherland Plaza Hotel. Cincinnati, Ohio. September 6–10.

American Physical Therapy Association. Copley Plaza Hotel, Boston, Mass. June 19–24.

**American Public Health Association—77th Annual Meeting, New York, N. Y. October 24–28.**

American Society of Medical Technologists. Hotel Roanoke, Roanoke, Va. June 20–23.

American Water Works Association:
Chesapeake Section. Wardman Park Hotel, Washington, D. C. November 2–4.
New Jersey Section Outing. June 23.

Canadian Public Health Association. 37th Annual Meeting. Halifax. June 28–30.

Commonwealth and Empire Health and Tuberculosis Conference. Central Hall, London, England. July 5–8.

Connecticut Public Health Association. Hartford, Conn. June 14.

Florida Public Health Association. George Washington Hotel. West Palm Beach, Fla. October 6–8.

Health Officers and Public Health Nurses of New York State. Lake Placid, N. Y. June 20–23.

International Association of Milk and Food Sanitarians. Deschler-Wallick Hotel, Columbus, Ohio. October 20–22.

Massachusetts Public Health Association. Amherst, Mass. June 15–17.

Michigan Public Health Association. Hotel Statler, Detroit, Mich. November 9–11.

Minnesota Public Health Conference. Nicollet Hotel, Minneapolis, Minn. September 30.

National Association of Sanitarians. Biltmore Hotel, Los Angeles, Calif. August 15–18.

National Conference of Social Work. Cleveland, Ohio. June 12–18.

National Convention of the American Red Cross. Atlantic City, N. J. June 27–30.

National Education Association. Hotel Statler, Boston, Mass. July 4–8.

National Society for Crippled Children and Adults. Commodore Hotel, New York, N. Y. November 7–9.

Third Inter-American Congress of Radiology. Santiago, Chile. November 11–17.

Washington State Public Health Association Spokane, Wash. September 19–20.

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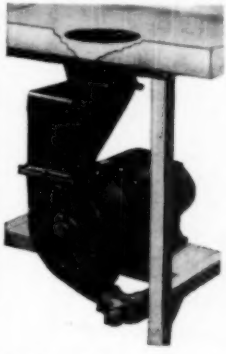

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*Spies, T. D.; Suarez, R. M.; Lopez, G. G.; Milanes, F.; Stone, R. E.; Toca, R. L.; Aramburu, T., and Kartus, S.: Tentative Appraisal of Vitamin $B_{12}$ as a Therapeutic Agent, J.A.M.A. *139*:521 (Feb. 19) 1949.

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